# THE SEA-MANS KALENDER.

OR,

## An EPHEMERIDES of the Sun, Moon, and certain of the most notable Fixed Stars.

*AS ALSO,*

## A Table of the LONGITUDE and LATITUDE of all the most eminent Places of the World, most exactly Calculated by JOHN TAP.

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*Newly Corrected and Enlarged with many Additions.*

*Viz:*

## Tables of the SUNS equall *Motions*, and finding of the SUNS true Place.

## *New exact Tables of the* NORTH-STAR.

New Tables of 77 of the principall Fixed Stars, their time of comming upon the *Meridian* every day. With their *Right Ascension* and *Declination*, &c.

With the discovery of a way to finde the long hidden Secret of LONGITVDE, By HENRY BOND, Teacher of the *Mathematicks* in the Bulwark neer the Tower.

*LONDON:*
Printed by ROBERT and WILLIAM LEYBOURN, for GEORGE HVRLOCK, and are to be sold at his Shop at *Magnus* Church-corner, 1652.

# TO THE COVRTEOVS *Readers Health.*

Entle and indifferent Readers, whoſe judgments are not ſo Sophiſtically mixed with humerous conceits & quipping Quiddities, (as many are now adays) who are apter with their turbulent tongeus to condemn all things, than with inſenſible judgments to amend any thing: As for them or any ſuch carping Zoyliſts, I am indifferent perſwaded to ſet as lightly by their partiall and injudiciall cenſures, as they are far from having a good opinion of ought but what is agreeable to their own phantaſtical fictions: Only to them that are of more plauſible Spirits and graver Judgments, who (for the moſt part in reading) applaud that which is good, and paſſe over with ſilence that which is not hurtfull, without ſcoffing the work or deriding the Authour; and to thoſe that have ſmall underſtanding, are deſirous of more knowledg in the *Art of Navigation*, and other Mathematicall ſtudies: to the one, I commit the cenſuring of my Work, and to the other the profit of my Labours: knowing that the wiſe will rather winck at ſmall faults, then raſhly reprove that which may profit others, though not pleaſure themſelves. And though

(as I say) the curious and expert Mariners, finde nothing hereinconteined, which may satisfie their expectation, yet I hope they will judg favourably of my intentions, and with patience passe it over for affection to the Art it self, wishing charitably that my skill were answerable to my will. As for the meaner sort, whose Experience have not been fitted with Arts rudiment, nor their judgments fined with demonstrative illustrations in the Mathematicall Sciences, but onely are now (as it were) setting themselves with willing minds to learn what before they wanted, I make no question, but as by these following *Tables* and *Propositions* they may reap profit, so accordingly, in yielding friendly censures upon me and my Works, they shall answer my expectation, with a full recompence of my passed labours: Further I have added hereunto for the better confirmation of my love unto the Practisers in this Art; I mean, such as are not acquainted with the *Doctrine of Triangles*, the explanation of Mr. *Ralph Handsons* five Nauticall Diagrams in his five severall Cases for the finding of the Suns *Azimuth*, by him wrought by the *Canon of Triangles in Petiscus*, and here amplified onely to the abridged Table of *Sines*, toward the latter end of this Book; further intreating the Courteous Readers, to do me that favour, as to correct what they shall finde amisse, either in the Printers over-sight or mine own Errour; and I shall not only endeavour the mending of them in the next Impression, but also be very thankfull for them at any time shall give me notice thereof, resting withall

*Your obliged Friend*

JOHN TAP.

*The Propositions follow.*

1. *For the Suns Azimuth, having no Declination.*

ADd the Complement of the *Latitude*: to the Complement of the *Almicanter*. Which if the totall be more then a Quadrant ſubſtract 90, and ſet down the ſine of the remainer for the firſt number. Again, add the Complement of the *Latitude* and the *Almicanter* and add the Sine thereof to the former, from the one half of that totall ſubſtract your firſt Number or ſine, and ſet down the remainer: Then, as the $\frac{1}{3}$ of the two firſt numbers added, is in proportion to the whole ſine, ſo is the ſaid remainer to the ſine of the Suns true *Azimuth*.

*Example,*

*Latit.* 51d. 30. the Complement 38d. 30. } Added makes 108d. 30m.
*Almicanter* 20d Complement 70d. 0m. } 90 ſubſtract leaves 18, 30m. whoſe ſine 3173 is the firſt number. Again, Complement of the *Latitude* 38d. 30 m. *Almicanter* 20d. added, makes 58d. 30 m. whoſe ſine 8526 is the ſecond number, thoſe two numbers added makes 11699 the $\frac{1}{3}$ thereof 5849, from which ſubſtract 3173 the firſt number, reſts 2676 for the remain: Then ſay,

As 5849 the $\frac{1}{3}$ of the two firſt numbers, is to 10000 the whole ſine, ſo is 2676, the remain, to the *Azimuth* deſired.

*Facit*, 4575. Whoſe Arch 27d. 17'. is the *Azimuth* from the Eaſt Southward

2. *When the Sun hath North Declination, the two Complements being equall to a Quadrant.*

ADd the Complement of *Latitude* with the *Almicanter* onely, and from $\frac{1}{3}$ the ſine thereof, ſubſtract the ſine of the Declination, and ſetting down the remainer.

As the $\frac{1}{3}$ aforeſaid, is to the whole ſine, ſo is the remainer aforeſaid to the ſine of the *Azimuth* deſired.

3 *When*

3 *When the Sun hath North Declination, the two Complements leſſe than a Quadrant.*

ADd the Complement of the *Latitude*, and the Complement of the *Almicanter*, ſetting down the Sine of the Complement thereof, then adde the *Almicanter*, and the complement of the *Latitude*, and from the Sine thereof ſubſtract the former, ſetting down $\frac{1}{3}$ of the remainer for the firſt found number: Again, ſubſtract the ſine of the firſt Complement from the ſine of the Decli. nation, and the remainer thereof; Again, ſubſtract from your firſt found number, and ſet the remainer thereof down for your ſecond number: and then,

As the firſt found is to the whole ſine, ſo is the ſecond to the *Azimuth* deſired.

4 *When the Sun hath North Declination, and the two Complements more than a Quadrant.*

ADd the Complement of the *Latitude*, and complement of the *Almicanter*, which being more than 90, ſubſtract 90, and ſet down the ſine of the remainer, then adde the *Almicanter*, and complement of the *Latitude*, and ſet down the ſine thereof, adde both the ſines together, and take the $\frac{1}{3}$ thereof for the firſt found number, then to the ſine of the firſt two complements, adde the ſine of the Declination, and from that totall ſubſtract the firſt found, and ſet down the remainer for the ſecond found: and then,

As the firſt found is to the whole ſine, ſo is the ſecond found to the ſine of the *Azimuth* deſired.

5 *When the Sun hath South Declination, and the two Complements more than a Quadrant.*

ADd the Complements, ſubſtract 90, ſet down the ſine of the remainer, add alſo the *Almicanter* and complement of *Latitude*, ad both their ſines, & ſet down $\frac{1}{3}$ of the total for the firſt found, then ſubſtract the ſine of the Declination, to the ſine of the remainer of the firſt two Complements, and that remainer again from the firſt found, which laſt remainer ſet down and ſay,

As the firſt found is to the whole ſine, ſo is the ſecond found to the ſine of the *Azimuth* deſired.

*In the tenth Aſtronomicall Propoſition, by the Tables of* Sines; *you have a generall rule with ſome Caution, to finde the Suns* Azimuth *newly added.*

# The SEA-MANS Kalender.

## Certaine Definitions, meet to be understood of those that will practise Navigation.

A Spheare or Globe, is a round figure, made by the turning of half a Circle, till it end where it began to be moved; or a massie body inclosed with one platform or surface; In the middle whereof is a prick, from which all Lines drawn to the surface are equall.

Center, is the point or prick alone, in the middle of a Spheare, Globe or other Circle.

Diameter, is a right Line drawn through the Center to the Circumference or surface of a Spheare or circle to each thereof.

Circumference is a round Circle equall distant on all sides from the Center thereof.

Surface or Superficies is the upper part of any thing.

A Degree is the 360 part of the Circumference of any Circle.

A Minute, is the 60 part of a Degree, being understood of measure: but in time, a Minute is the 60 part of an hour, or the fourth part of a Degree, 15 degrees answering to an hour, and 4 minutes to a degree.

The Pole is a point or prick imagined in the heavens, whereof are two, the North Pole being the Center, to a Circle described by the motion of the North Starre, or the tayl of the little Beare: from which point aforesaid is a line imagined to passe through the Center of the earth, and passing directly to the opposite part of the Heavens, sheweth the South Pole.

The Equinoctiall, is a great Circle imagined in the Heavens: also dividing the heavens into two equall parts, and lying just in the middle betweet the two Poles being in compasse from each

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to Eaſt 360 degrees; every degree on the terreſtiall Globe being valuing 20 Engliſh leaves or 60 miles.

The Meridian is a great Circle dividing the Equinoctiall at right angles into two equall parts, paſſing alſo through both the Poles, and the Zenith; to which Circle the Sunne comming twice every 24 houres, maketh the middle of the day, and the middle of the night.

Note that every place hath a ſeverall Meridian, which do all meet together in the Poles of the World.

Zenith is a point or prick in the Heavens, right over our heads 90 degrees from the Horizon, as the Pole is 90 degrees from the Equinoctiall.

Nadir is a point or prick in the heavens under our feet, oppoſite to the Zenith.

Horizon is a great Circle dividing that part of the Heavens which we ſee, from the other part which we ſee not.

Azimuth, is a great Circle, croſſing the Horizon at right angles, as the Meridians do the Equinoctiall, being as many as the Meridians, and as the Meridians concurre and meet together in the Poles of the World, ſo do the Azimuths meet in the Zenith, which is the Pole of the Horizon.

Parallels, are Lines or Circles equally diſtant in all parts one from another, as all Circles of Eaſt and Weſt are parallel to the Equinoctiall.

Almicanteraths, are Circles parallel to the Horizon, being alſo Circles of Altitude or Elevation, being that the Altitude of the Sunne, Moon, or Starres, above the Horizon are deſcribed thereby: which Almicanters do croſſe the Azimuthes, as the Parallels or Circles of Eaſt or Weſt do croſſe the Meridians.

The Tropicks are two leſſer Circles parallel to the Equinoctiall limitting the bounds of the Zodiack, or the greateſt declination of the Sun on each ſide of the Equinoctiall; The Tropick of Cancer Northward, and the Tropick of Capricorn Southward, whoſe diſtance from the ſaid Equinoctiall are 23 deg. and 32 minutes.

The Zodiack is a great Circle croſſing the Equinoctiall in two oppoſite places thereof, [illegible] by as much there from, towards either of the Poles, touching the Tropick of Cancer on the North

North part, and the Tropick of Capricorne, on the South part thereof. In the Zodiack are 12 Signes, viz. Aries, Taurus, Gemini Cancer, Leo, Virgo, Libra, Scorpio, Sagitarius, Capricorne, Aquarius, Pisces: every signe being 30 degrées in length, and 12 in bredth: Through which signes, the Sunne passing describeth a Yeare, and the Moon passing likewise through the same, makes a Moneth: The 12 degrées that the Zodiack hath in bredth, are allowed for the Latitude of the Planets.

Ecliptick is a Circle lying just in the middle of the Zodiack, out of which the Sun never goeth, but the Moon and other Planets are sometime on the one side, and sometime on the other side thereof, in which the head and tayl of the Dragon also is.

The head and tayl of the Dragon are two oppolite points in the Ecliptick line of the Zodiack which goeth backwards through all the 12 Signes in 19 years: And when it happeneth that the Sun and Moon are in conjunction, in that place of the Ecliptick, where the head or tayl of the Dragon is, then is the Sun eclipsed and being in the Oppolitions, the Moon being in either of the said points, the Moon shall be Eclipsed.

The Polar Circles are two little Circles distant from the Poles of the world so much as is the greatest declination of the Zodiack from the Equinoctiall: in which Polar circles are the Poles of the Zodiack. The one of these Circles being above the North Pole is called the Artick Circle: the other being about the South Pole, is called the Antartick Circle. And these two Circles inclose all those Stars which neither rise nor set in any Latitude, but are always above the Horizon, where either of the said Poles are reised.

Colures are two great Circles passing through both the Poles, crolling one another in the said Poles at right angles, and dividing the Equinoctiall and the Zodiack into four equall parts making thereby the four Seasons of the year. The one Colure passing through the Equinoctiall points of Aries and Libra, sheweth the beginning of the Spring time and Autumne, which two times the Dayes and nights are equall. The other Colure passing through the two Tropicall points of Cancer and Capricorn, sheweth the beginning of the Summer and Winter: at which two times, the dayes are longest and shortest.

Altitude, in the Heavens, is the height of any thing above the Horizon towards the Zenith.

Latitude is the wideneſſe and diſtance of the Planets or Starrs from the Ecliptick, either Northward or Southward. Alſo Latitude is the diſtance of the Zenith of any place from the Equinoctiall toward either of the Poles, which is always equall to the height of the Poles of the ſame place.

Longitude is length, and in the heavens it is underſtood the diſtance of any Starre or Planet from the beginning of Aries, to the place of the ſaid Planet or Starre, or from the beginning of any ſigne to a certain other part or degree of the ſame: Otherwiſe Longitude in the earth, is the diſtance of the Meridian of any place from the Meridian which paſſeth over the Iſles of Azores, where the beginning of Longitude is ſaid to be. Longitude is counted upon the Equinoctiall, and Latitude upon the Meridian.

Declination is the declining or diſtance of the Sun, Moon, or Starres from the Equinoctiall, and is ſaid to be North or South, according to the Pole towards which it leaneth.

Amplitude, is the diſtance of the riſing and ſetting of the Sun, Moon, or Starres from the true Eaſt or Weſt point of the Compaſſe upon the Horizon.

Aſcenſion is the riſing of any Star, or of any portion of the Ecliptick above the Horizon. Right Aſcenſion, is the number of degrées and min. of the Equinoctiall which commeth to the Meridian with the Sun, Moon, Star, or any part of the Ecliptick.

Oblique Aſcenſion is the number of Degrées of the Equinoctiall, which commeth to the Horizon with any Star, or any portion of the Ecliptick: in which ſort is Oblique Deſcenſion alſo.

Aſcenſionall Difference is onely the remainer, the one being ſubtracted or taken from the other.

The Golden number or Prime is the time of 19 yeares: in which time the Sun and Moon make all the variety of their Conjunctions Oppoſitions, and other Aſpects.

Epact is the 11 dayes and 6 houres, which are added to the year of the Moon, being 354 dayes, to make it equall with the year of the Sun, which conſiſteth of 365 dayes $\frac{1}{4}$. By the Prime, is found out the Epact, and by the Epact, is found out the age of the Moone,

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The Circle of the Sun, is the number of 28, because that in 28 yeares all the variety of Dominicall or Sunday Letters, and Leap-yeares are expired, being that at the 29th year the Circle doth begin again: The use of which number is to find out the Dominicall Letter for any year past, present, or to come: Where note, that there is but 7 Letters which serve for Sunday-letters, viz. A.B.C.D.E.F.G. And albeit that in the dayes of the week they proceed according to their naturall order of the Alphabet, yet in the yeares they go backward: as if G, be for one year, F shall be for the next; and when it is Leap year, (which is every fourth year) then is there two Letters for the year, the first serving from the 1 of January, till St. Matthias day, which is then the 25 of February, and then the other letter takes place, and serves till the year end.

To find which number of the Suns circle, and consequently the Dominicall letter for the year proposed, to the year of our Lord, adde 9, that totall divide by 28, and that which remaines, is the Circle of the Sun for that year. Then to know the Dominicall letter: Note that the 28 year, the Dominicall letter is A, and is the third from the Leap-year; therefore the first to begin withall, again, is G F, because it is another Leap-year: and so counting the 7 Letters backward, and every fourth year counting two letters: That letter upon which the number of the Suns circle ends shall be the Sunday letter for the year proposed.

As for example.

The year 1647 adding 9 thereto, it makes 1656: that being divided by 28, the Remainer is 4, the Circle of the Sunne: then counting 4 letters backward, according to order, till I have counted four places, beginning with GF. thus: 1. G F 2. E 3. D &c. I find the fourth place ends upon C, which I conclude to be the Dominicall letter for the year aforesaid: And it is the 3d year, after Leap-year.

And here is to be noted, that the Prime and Dominicall letter, changes the 1. day of January, and the Epact the 1 day of March.

To finde out the Prime.

Divide the year of our Lord, by 19, and to that which remaineth after the Division, adde 1: The Product is the Prime, number for all that year.

As for example.

I would know the Prime for the year 1645, divide 1645 by 19, and you shall have in the Quotient 86, and after the division there rests 11, unto which if you adde 1, it makes 12, which is the Prime for that year 1645.

To find out the Epact.

ADd to the Epact of the year past 11, and if it passe 30, take away 30, and the Product is the Epact for all that year: but otherwise, which is the better way; Imagine three places upon your hand, which for example, let be the three joynts of your fingers, and call or name the first joynt 10, the second 20, the third 30, then count the Prime number upon the three joynts aforesaid, and going over them: untill you come to the end of the said Prime number, mark upon which your Prime ends, and adding the number of the joynt with the Prime. if they come not to 30, that shall be the Epact for all that year. If they passe 30, take away 30, and the remainer is the Epact, if it be just 30, then is the Epact equall to the Prime.

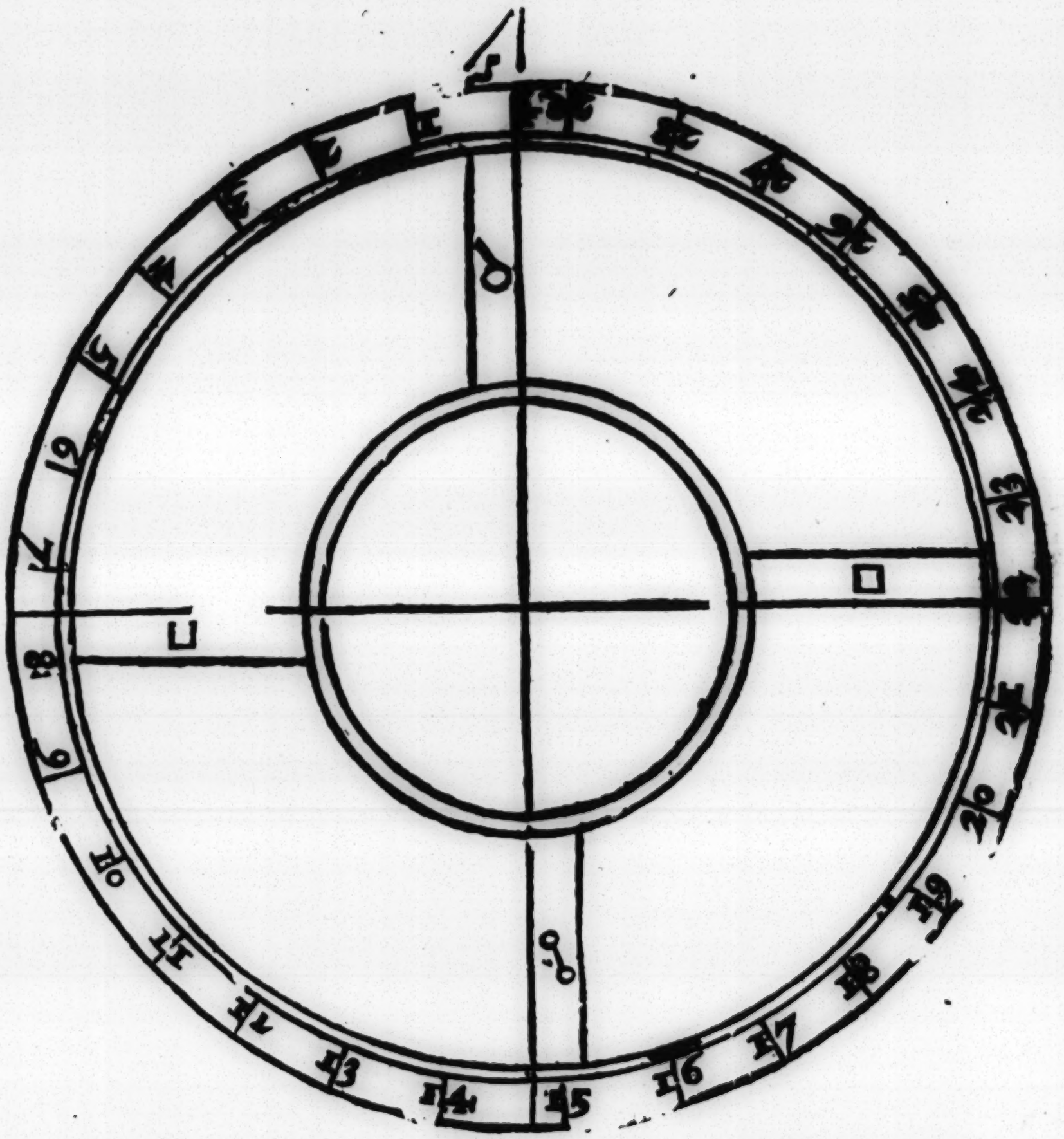
As for example.

The year 1645, the Prime is 12, and imagining the first joynt of my finger, to be 10, the second 20, the third 30, I count upon the three joynts 12, the Prime number, viz. upon the first joynt, I tell 1, on the second 2, on the third 3. Again, on the first 4, the second 5, and to 12, which is the Prime, ending upon the third joynt which I call 30, therefore adding 30 the number of the third joynt, makes 12 for the Epact of the year 1645 aforesaid.

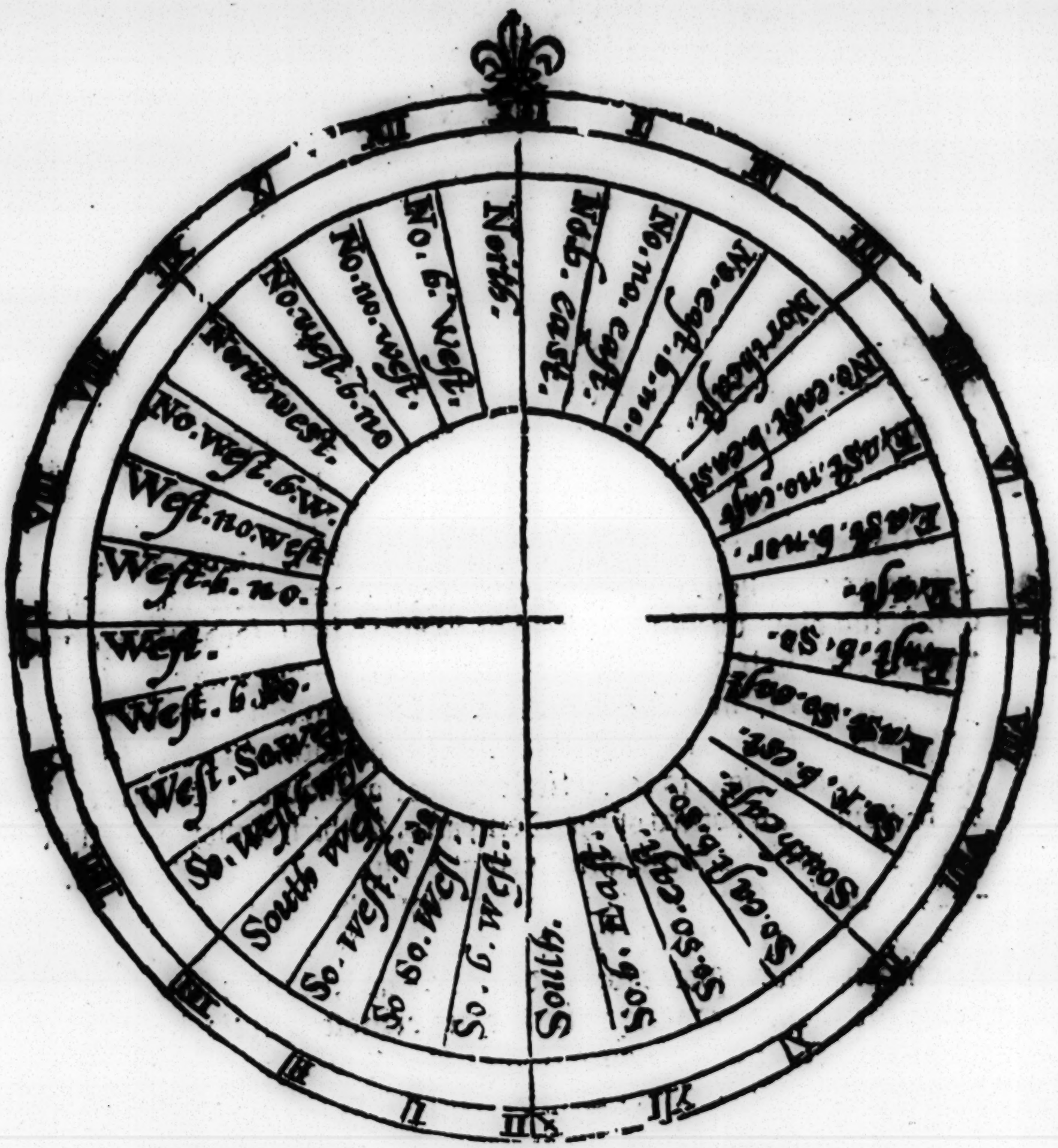
To know the Moons age.

ADde to the day of the Moneth the Epact, and so many dayes more, as are Moneths from March to the Moneth you are in, including both Moneths, and if they come not to 30 so much is the Moones age: But if they passe 30, take away 30, and the overplus is the Moons age.

This is when the Moneth hath 31 dayes, but if the Moneth hath but 30 dayes, you must take away but 29, and the rest is the Age aforesaid, for in these Moneths that have 31 dayes, the Conjunction is the 30 day of her Age, and those Moneths that have but 30 dayes, the Conjunction is the 29 day of her Age.




The foure white quarters within the utmoſt Circleare to be cut out, and then the figure to be placed upon this Compaſſe following.




## A Declaration of the former Instrument.

THis Instrument gives you a plain and easie Order for the shifting of the Sun and Moon for every day of her Age: and also it is a ready and most necessary reckoning of the Tides, whereby also is shewn the common Order, to bring thereby the 32 points of the Mariners Compasse, to 24 Houres of the Day, and

and Night, which are the first Rudiments to be learned of a young Scholer or Apprentice in Navigation.

First, here is the common Mariners Compasse, with the xxxij points thereof plainly set down, the Names being printed upon each severall point, which must be perfectly learned without book; then is there in the uttermost edge, a Circle devided into 24 parts, which signifie 24 houres of the Day and Night, where you may see that 12 a Clock at night is just upon the North point of the Compasse: 12 at Noon upon the South point of the Compasse: at 6 a clock in the Morning upon the East: and 6 at Night upon the West point of the Compasse: and for the other points of the Compasse there agréeing with the houres, every point of the Compasse makes $\frac{1}{4}$ of an hour, as you may see North and by East is upon $\frac{1}{4}$ of an hour past 12 N. Northeast one hour, and $\frac{1}{2}$ Northeast and by North 2 hours and $\frac{1}{4}$, and consequently of the rest.

Also to the center of the Compasse is fixed a moveable Circle, to turn round about the said Compasse, the uttermost edge whereof moving close within the circle of Houres, is devided into 29 equall parts, and a half signifying the dayes of the Moones age, which are numbred in Arithmeticall figures, from the first day of her Age, to her Conjunction or méeting, again with the Sunne: at which place of her Conjunction, is left a little Inder or shewer, to direct you to the hours and points of the Compasse. Which Inder also shews you how much the Sun, and Moon are asunder every Day of her age, by telling the points of the Compasse betwixt the number of the Moons age in the said moveable Circle, and the Inder thereof, accounting every Point for 11 degrées, and $\frac{1}{2}$, or otherwise the number of the Houres conteined in the uttermost Circle betwixt the said number and Moones age and the Inder, accounting every Hour for 15 degrées, shews the degrées of distance betwixt the Sunne and the Moone.

Now to kéep reckoning of the Tides thereby, you must know by the Table hereafter set for that purpose how it flowes: that is to say, what Moon makes full Sea or high water, at that place, where you would know the time of the tide or high water, for the day proposed: which known, you must also by the former Propositions, or else by the Kalender following, know the Moones age, then

then ſeeking out the number of the Moons age in the moveable Circle, place the ſaid number of the Moons age upon the point of the Compaſſe which makes full Sea upon the change day at your place deſired, and ſtaying it there, the Index which is in the ſaid moveable Circle, points you directly to the point of the Compaſſe that the Sun muſt be upon when it ſhall be high water the foreſaid day in the deſired place, and alſo in the uttermoſt fixed Circle, it ſhews the hour of the day which you deſire.

As for Example: The firſt of January, 1645. I deſire all this aforeſaid: Firſt, for the Moons age, becauſe that the Epact changeth not till the firſt of March, I adde the Epact of the laſt yeer, before which is 12, and the day of the Moneth 1, is 13. Then January being the 11 Moneth from March, 11 added thereto, makes 24 for the Moons age the firſt of January 1645.

Again, to know how much the Sun and Moon are aſunder, the Moon being 7 dayes old, I ſeek in the moveable Circle for the Moons age, which being 7. I place 7 upon a certain point of the Compaſſe, which for example is here Weſt, and the Index ſhews the North and by Weſt and ¾ to the Northward, which is 7 points and ¾. That multiplyed by 11¼ the number of degrees that belong to a point of the Compaſſe, makes 87 deg. 32 min. for the diſtance betwixt the Sun and the Moon, and in hours it ſhews 5¾, which multiply by 13 yeilds the like, being very neer ¼ of the Zodiack.

Then for the tides at London-bridge, it flowes Southweſt and Northeaſt, or is high water at 3 a clock on the Change day, therefore when the Moon is 7 dayes old, I place 7 the Moons age upon the point Southweſt at 3 a clock, and ſtaying the moveable rundle, there I ſee that the Index ſhews almoſt Northweſt, which is 40 minutes neereſt hand, or neer 3 quarters of an hour paſt 8 of the clock, at which time it ſhall be high water at London-bridge, the Moon being 7 dayes old.

Again at Harwich where it flowes South and by Eaſt the Moon being 10 dayes old, I lay 10 (the Moons age, upon the point of the Compaſſe South and by Eaſt) and then the Index ſhews the point Weſt Northweſt, of the Compaſſe, and in the Circle of hours ⅓ of an hour paſt 7, which is the time of the full Sea at Harwich, the Moon being 10 dayes old.

But if you want a Table or Inſtrument to worke the account of the Tydes, you may do it by memory, multiplying the Moones age by 4, and divide the product by 5, and for the Quotient allow for every unity which remaineth upon your dividing 12 min. that so added to th' houre that it makes full Sea on upon the Change day, the Product ſhall be your deſired number, as in the firſt Example.

The Moon 7 dayes old, and the High water at London, on the Change day at 3 of the clock, I multiply 7 (the Moons age) by 4, makes 28, that divided by 5, the quotient is 5, and 3 remaineth undiviſion, which 3 being ſo many times 12 min. makes 36 min. and added to 5, in the Quotient makes 5 houres, 36 min. that added to 3, the houres of full ſea, upon the Change day, makes 8 of the clock and 36 min. as aforeſaid.

### An exact way for the Tides.

How neceſſary (nay of what neceſſity) the true account of the Tydes is, every man that taketh Charge (at leaſt hee that taketh care of his charge) doth very well know; and yet no one thing (by moſt men) more groſly ſlubbered over than this, for there is onely a generall Rule uſed, as if all places were under the North Pole, where the Equinoctiall is the Horizon, and that the departure of the Moone from the Sunne, were at all times equall; in both which reſpects, the Rule is moſt groſly abuſed. For in North Latitude, 51 degrees, 30 minutes the Moon being in Cancer, and having 5 degrees, 0 minutes North Latitude it is 30 minutes paſt 10 of the clock before the Moone will be Southeaſt, and at 30 minutes paſt one of the clock, the Moon will be Southweſt, and for any point neerer to the Eaſt or Weſt, the errour will be greater; againe if he be in Latitude 30, or in Latitude 40, it will be farre greater.

The miſ-account of which time from a high water, may caſt away ſhip and goods, in going into a Harbrough where water is ſcarce, where it is to be looked unto and reſpected. To correct this Error, I will here propound a very exact, eaſie and plaine way to account the tides.

Firſt, You muſt underſtand, that in obſerving the Tides, the beſt way is to goe by the time of the day [illegible]

and

and not by the Moone being upon such a point of the Compasse, the meaning is thus. If the table shewes it is high tide at London, the Sunne being S. west, and this by the instrument shall be 3 of the clock on the day of new or full Moon. Now if it is true, that it is at 3 high tide at London, at 3 of the clock, on the day of new or full Moon; but if you should observe the Moon in the heavens by your Compasse, you shall finde, that the Moon is not always South west at 3 of the clock upon the day of new and full Moon.

For example. At the new Moons in June, and the full Moons in December, the Moon is about the tropick of Cancer, and then in Latitude of London, she is South west at 3 quarters of an houre past 1 of the clock, but it is not high tide till 3 of the clock, and then the Moon will be full South-west, which is two points further.

Also it is very necessary, to observe the difference which is betwixt the Moone times, when the Moone is in the equinoctiall, and the solsticiall times, when the Moone is at the new and full Moon. For the Moone times will be an houre and somewhat more, later then the Instrument doth shew them. For example. The Moon being in the first quarter, the Instrument shewes, that it is high time at London, at 9 of the clock: but if you observe the time of the Moone, you shall finde that it is high tide before 8 of the clock. The like difference (I believe) is in other places. Therefore to knowe the true time of the Tides, you must subtract some minutes, from the time shewne by the instrument, according to the age of the Moone, as is shewne by this little Table.

For example. The Moon being 5 dayes old, it is high tide at London, by the Instrument at 7 a clock, but you must by this Table subtract 30 minutes from this time, and so the true time of the tide at London is at 6 of the clock, and 30 minutes.

| The Moones age. | | | | | H. M. |
|---|---|---|---|---|---|
| 1 | 14 | 16 | 29 | Subtract | 0 0 |
| 2 | 13 | 17 | 28 | | 0 5 |
| 3 | 12 | 18 | 27 | | 0 10 |
| 4 | 11 | 19 | 26 | | 0 20 |
| 5 | 10 | 20 | 25 | | 0 30 |
| 6 | 9 | 21 | 24 | | 0 40 |
| 7 | 8 | 22 | 23 | | 0 [illegible] |

## The Government of the Planets.

Divers Writers have disagreed, concerning the Planetary houres, some making the houres of the Planets equall with

the houres of the clocks, and so continuing their Regiment orderly with the other common houres. Some againe beginning the said Planetary houre at Noone, some at Midnight, and some againe at Sun-rising: Which indeed for the time of the beginning of the accompt is best, and for the difference of the equality and inequality betweene the Planetary houres, and the common houres of the clocks. Gemma Frisius agréeing with the best Astronomers saith, That as the dayes and nights do increase or decrease, so must the Planetary houres be longer or shorter accordingly, nevertheless so that there shall be 14 Planetary houres in the day and Night, aswell as of other hours: but that if the day consist of more than 12 houres, then proportionably the Planetary houres to consist of more than 60 minutes. And if the day be lesse than 12 hours, then the Planetary hours are to be lesse than 60 min: and if the day be just 12 hours, then the Planetary hours are equall to the hours of the clocks, and not otherwise. The like is to be understood in the nights, and to make an equality of the Planetary houres to them of the clocks, being that how long soever the day is, yet there must be but 12 Planetary hours: and how short soever the day is, there must (nevertheless) be 12 Planetary houres, are sometimes greater, and sometimes lesser than the common hours of the clocks, which always consist just of 60 minutes: therefore if you divide the day into 12 equall parts, one of those parts shall be the quantity of a Planetary hour, which you may do thus: Multiply the houres of the day into minutes by 60, and if there be any odde minutes, adde them to the Product, the totall being divided by 12, the quotient shewes the number of min. contained in an unequall or Planetary hour.

And again, if at any houre of the Day or Night you know not what Planetary hour it is, that is to say how many Planets have ruled since the beginning of the Day or Night proposed, multiply the number of the hours past from Sun rising by 60, and divide the Product by the number of the minutes contained in unequall or Planetary hours; the Quotient will shew you how many hours and minutes of the Planets are past from the Sunne rising (if it be in the Day) or from Sun setting (if it be in the Night) which division, enter the Table following, to know what Planet rules

the

the day and hour proposed, looking for the hour & minute in that Co-
lumn which is right under the two Planets [illegible] are governours of the [illegible] placed on the side next the left hand, and the Governours of the night on the right hand.

| Governours of the Day. | Sunday | | Munday, | | Tuesday, | | Wednesday | | Thursday | | Friday, | | Saturday | | Governours of the Night. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sol, | 1 | | 12 | | 9 | | 0 | | 10 | | 0 | | 11 | | Jupiter, |
| Venus, | 2 | | 0 | | 10 | | 0 | | 11 | | 1 | | 12 | | Mars, |
| Mercur. | 3 | | 0 | | 11 | | 1 | | 12 | | 2 | | 0 | | Sol, |
| Luna, | 4 | | 1 | | 12 | | 2 | | 0 | | 3 | | 0 | | Venus, |
| Saturne | 5 | | 2 | | 0 | | 3 | | 0 | | 4 | | 1 | | Mercur. |
| Jupiter, | 6 | | 3 | | 0 | | 4 | | 1 | | 5 | | 2 | | Luna, |
| Mars, | 7 | | 4 | | 1 | | 5 | | 2 | | 6 | | 3 | | Saturne, |
| Sol, | 8 | | 5 | | 2 | | 6 | | 3 | | 7 | | 4 | | Jupiter, |
| Venus, | 9 | | 6 | | 3 | | 7 | | 4 | | 8 | | 5 | | Mars, |
| Mercur. | 10 | | 7 | | 4 | | 8 | | 5 | | 9 | | 6 | | Sol, |
| Luna, | 11 | | 8 | | 5 | | 9 | | 6 | | 10 | | 7 | | Venus |
| Saturne | 12 | | 9 | | 6 | | 10 | | 7 | | 11 | | 8 | | Mercur. |
| Jupiter, | 0 | | 10 | | 7 | | 11 | | 8 | | 12 | | 9 | | Luna. |
| Mars. | 0 | | 11 | | 8 | | 12 | | 9 | | 0 | | 10 | | Saturne. |

Example.

The 17 day of May being Sunday at 9 of the clock in the morning, I would know what Planet rules? First, in the following Kalender, I finde that the 17 of May, the day is 16 hours long; therefore I multiply 16 hours, by 60 minutes and the product is 960, that divided by 12, bringes in the Quotient 80 minutes for the length of a planetary hour at that time, then from 4 of the clock (the time of the Suns rising) till 9 a clock, the hour proposed is 5 hours, which multiplyed by 60, brings 300, that divided by 80 (the length of a Planetary hour) brings in the Quotient 3 hours, and there remains upon the Division $\frac{60}{80}$ parts, that is three quarters of a Planetary hour more: so I conclude, that at 9 of the clock, 3 Planets have past their Regiment, and the 4th. hath ruled 3 quarters of his houre: Therefore under the title Sunday, in the top of the Table, I looke for 4 toward the foot of the said Table, against which on the left hand is placed Luna; therefore I say, that the 17 day of May, being Sunday at 9 of the clock in the morning, Luna shall have reigned 3 quarters of her hour.

# A Rutter for the Courses round about *Ireland*, from Cape to Cape, and what Tides makes in every Harbour, and how many Leagues it is from Harbour to Harbour.

Appinde, from Care cleere to the Mison head, is 7 Leagues, and lyeth West and by North, and East and by South, you shall find a Haven Northwest from Cape-cleer, called Crooke haven, and it floweth there East Northeast, and West Southwest; you must go West to enter into it.

From the Mison, to the Durzib, is 7 leagues, and lyeth West Northwest, and East southeast.

Beare Haven lyeth from the Mison-head, North northwest 3 leagues and a half, you must goe Northwest into the Haven, it floweth E. northeast, and W. southwest: If you will anchor between the Durzib, and the main Land, you must go aboard the Iland, for the East side is not sound.

The three Ilands that be off the point of the Dourzies, which is called the Bull, the Cow, and the Calfe, they be sound, and you may go within them, or else between them, for there is no danger but what you may see.

*Dourzies* and Blaskey, lye North and by West, and South and by East, and there is betwixt them 12 leagues, the Skellocks is between both, and it floweth northeast and southwest.

Northeast off the great Skellocks, 2 leagues off you shall find the entry of Vallens, you must runne E. southeast to enter in, it floweth E. Northeast; you must beare aw of the Iland to enter in, for the point on the Easter side is long.

North northeast off the great Skellocks 6 leagues off, you shall find the Haven of Ventry, which is a good Road: It floweth East northeast.

North-

Northeaſt by North off the [illegible] Skelligs, 7 leagues, [illegible] ſhall [illegible] Haven of Dangell, [illegible] len the Crow, which is [illegible], doth not cover but on a ſpring tide: you muſt run [illegible] by weſt into the haven, it floweth E. [illegible] and W. [illegible].

The Ventry and the Sound of Begue, lyeth South by Eaſt, and North by Weſt 3 leagues, and when you are paſt into the Sound of Begue you muſt lye Eaſt and by north into the Road againſt a red Cliff, which is on the South ſide.

Southeaſt [illegible] the Sound of Blaskey, a ſix leagues off, you ſhall find a good harbour named Begue, which is to the Northeaſt [illegible] lence: The ſaid haven hath two entries, but the Weſt one is the beſt: you muſt take great heed of a ſunk Rock that is on the [illegible] ſide, which you muſt leave on your Larbord ſide going in, and it floweth E. northeaſt, and W. ſouthweſt.

You ſhall underſtand, that the ſaid Sound of Blaskey, lyeth [illegible] eaſt and Northweſt, but you muſt take heed of a [illegible], that lyeth on the Eaſt ſide, a thwart the *Sezebras*.

From Blaskey to Smerrick, is 3 leagues, and if you [illegible] the Heaven, you muſt [illegible], [illegible]: It floweth [illegible] north-eaſt, and [illegible].

There is a Hill to the Eaſtward of Smerrick, which is called Sinbrandon, goe from Smerrick Eaſt northeaſt, and you ſhall [illegible] with Lopus head, which maketh entry of the River of Limerick, on the Northſide: there is from the one to the other, 10 leagues.

Smerrick and the head of the Kerry, lye Eaſt Northeaſt, [illegible] ſouthweſt, 7 leagues aſunder, and there is within the Bay [illegible] Iſlands called Saline.

From Lowpſhead to the Seatties, is 7 leagues, they lye E. N. E. and W. S. W. and if you enter into the River, [illegible] half way between Lawpſhead, and an Iland called [illegible], which you muſt leave on the South ſide, and to the Eaſtward of that Iland, is a good road: It floweth E. N. E. and W. [illegible].

From Scarrick to Quoyne, is 5 leagues, you muſt [illegible] Eaſt, and you ſhall [illegible] two Ilands, they be flat Ilands, goe to the Northwards [illegible] them, and from thence run Eaſt North-

eaſt,

[illegible] Bieffe, [illegible] Bieffe. And [illegible] the said Mark, [illegible] Mark called the [illegible] Dorley and [illegible] the Land aster as you can, for [illegible] the Winde going into the Haven, and you must ryde at the Castle by foure Cables, for there goeth a great tide. it floweth East north east, and West southwest.

The Sound of Blaskey and the Ilands of Arrin, lyeth South [illegible], and South Southwest, and there is between them 16 leagues: the Ilands lye East and West, and makes the entry of Galloway, and of the other Ilands: there is one which is naught but the Westest sound is good, and the next sound to it is good, which is called the little sound, but the sound comming from the East is naught, but the next comming the Blackshore from the East is part [illegible] but you must put the two partitions to the Iland for it is dangerous: You must understand that there is one Iland in the course betwixt Lawpshead and the entry of Galloway, that hath a [illegible] a league and a half off the main land.

[illegible] the Coast of Galloway, you shall see the Blackshore, and being the Blackshore, Southeast of you: then go South-east, and you shall fetch the Iland called Motton Iland, and there [illegible] both these leagues: You must not trust to the South [illegible] there is a Shoal half way to the Black shore, and the Iland of Motton, [illegible] of two white points, which is on the [illegible].

The said Shoald is upon the Westest Southwest side of the said Iland of Motton, a league and a half off at a Spring tyde, then shall you see it pay, and it [illegible] at the said Iland, East northeast, and [illegible].

The Sound of St. Gregory, and the Rode of Galue, lyeth East northeast, and West. [illegible], and there is betwixt them 8 leagues.

The Sound of St. Gregory and Silvis-head, lye Southeast and [illegible], and the distance betwixt them is 9 leagues.

Stulbed and Sarke, lyeth South by West distant 15 leagues.

Black-rock is an Iland which is Westest of Kil-head, a league off

off the Cape: and the ſaid Black-Rock and the Stags, lyeth North-eaſt and by north, and are diſtant 12 leagues.

From the ſaid Black rock, run North and you ſhall finde the Ilands of Eaſt Eves, and there is between them 2 leagues.

South ſouthweſt off the Staggs, there is a Haven called Broad-haven, from the Haven to the Stags is two leagues; Stags is a Cape that maketh the entry of the River of Raffen, they lye Eaſt and Weſt, and are diſtant 8 leagues: the Staggs and the Cape of Tellen, lye northeaſt, and ſouthweſt, and are diſtant 15 leagues.

Betwixt the Stags and the Cape of Tellen, in the Bay, is the Haven of Moy, the Haven of Portway, the Haven of Slego, the Haven of Baleeſhannen, the Haven of Dongall, the Haven of Kellekeg, and the Haven of Tellen.

The Cape of Tellen, and the Iland of Arron, lye North northeaſt, and South ſouthweſt, and are diſtant 7 leagues.

The Iland of Raghlenburne, and Tellen, lye Southweſt and Northeaſt, and are diſtant two leagues.

The Iland of Raghlenburne, and the Iland of Torre, lye North northeaſt, and South ſouthweſt, and are diſtant 14 leagues.

To the Eaſtward of Torre, is a Cape, called Horne-head, and are diſtant 2 leagues: Southeaſt of Horr-head, is a Haven called Sheep-haven, it floweth Eaſt and Weſt, but you ſhall have in the Bay a good Road for all winds: the ſaid Haven is a broad Haven, and is two leagues from the Cape.

Horne-head and the entry of Loughfoyle, lye Eaſt northeaſt, and weſt ſouthweſt, and are diſtant 6 leagues.

The entry of Loughfoyle, and the Iland of Enerſterhould, lyeth Northeaſt and Southweſt, and are diſtant 5 leagues.

The Iland of Torre and the Iland of Enerſterhould, lyeth Eaſt and by North, and Weſt and by South, and are diſtant 9 leagues.

The entry of Loughfoyle, and Enerſterhould, lye Southeaſt and Northweſt, and are diſtant 5 leagues.

The Iles of Enerſterhould, and Skirris Portruſh, lye Eaſt ſouth-eaſt and Weſt northweſt, and are diſtant 10 leagues.

You muſt underſtand, that the River of Loughfoyle, lyeth

from Skirris Portrush, West southwest, and East northeast, and there is betwixt them the River of the Band: there is between Portrush, and Loughfoile 5 leagues: There is in the entry of Loughfoile, a Sand which is called the Tonnes, which is dangerous for any Ship of charge: also there is a channell on the East side of the Tonnes, hard aboard the shore, but you must have your tide: It floweth East by south, and West by north: Skerris Portrush and it lyeth South and North, and are distant 12 leagues.

Skerris Portrush and the Ilands of the Raghlings lye Northeast, and by east, and Southwest by west, and are distant 5 leagues: it floweth in Skerris East southeast, and W. northwest, the flood commeth from the Eastward.

Off the Raghlins, is a Cape called the faire Forland, and betwixt them is a league and a halfe, the fair Forland and the Knee lyeth South southeast, and North northwest, and are distant 9 leagues.

The fair Forland and Loughrian, in Scotland, lye East southeast and West northwest, and are distant 15 leagues.

There is betwixt the Knee and Carrick-Vergus 5 leagues.

The point of Loughrian and the Ilands of Commoras, off Scotland, lye North and south, you must passe by Elliso and by the Haven of Lambach asunder 7 leagues.

The point of Loughrian and Compnam Iles, lyeth Northeast and southwest.

The Knee and the Rock of the Maydens lye Northeast by N.

The Knee and Elk in Scotland, lye Northeast by east distant 10 leagues.

Loughrian in Scotland, and the Mould of Galue, lyeth South southeast, and North northwest, and are distant 7 leagues.

The Mould of Galue, and the Calf of Man, lye South southeast, and North northwest, and are distant 10 leagues,

The Compnam Iles, and the road Carrick-Vergus, lye East and West, and are distant 14 leagues; it floweth in the Sound east, southeast, and west northwest.

Compnam Iles, and the point of the Moulens, lyeth South southeast, and North northwest distant 7 leagues.

The

The point of the Moulens and the Ile of Lambay, lye South southwest, and North northeast, and are distant 21 leagues.

Lambay and Carlingford, lye North northwest, and S. southeast, and are distant 18 leagues.

Lambay and the Ile of *Dalke*, lye South southwest, and North northeast, and are distant 5 leagues.

The banke of Wiclo, beginning thwart of the Forth of Dublin, and continues to the Ile of Tosker, they lie North by west, and South by east. and they lie in length 24 leagues.

Tosker and the point of the Grenord, lie E. and by north, and W. and by south, distant two leagues.

And when you are bound to the Eastward off the Grenord, you must keep the Mountain of Washford above the low land, and so you shall go clear of all the dangers betwixt you and the shore: And if you close the Mount with the low land, then you shall go with the dangers.

Tosker and the Cape of Canwall, lie South by East, and North by West 40 leagues.

Tosker and the Salts lye East northeast, and West southwest distant 6 leagues.

The Salts and Silly, lye South and North, and are distant 33 leagues.

The Salts and the Tower of Waterford, lye East and West, and are distant 5 leagues.

The Tower of Waterford and the Ile of Ballecutin, lie Southwest by West, and Northeast by east, but betwéen the Tower of Waterford and Ballecutin, is a haven, called Yoghall, and a Seaward it, is an Iland called Capell-Ile, and betwéen Capell-Iland and Ballecutin, is 4 leagues.

The Tower of Waterford and Heluick-head, lyeth East and West distant 3 leagues.

Capell Iland and the Iland of Ballecutin, lye West southwest, and East northeast, and are distant 3 leagues and a half.

Ballecutin and Cork Haven, lye West by south, and East by north, and are distant 3 leagues and a half.

Oyster Haven and the Old head of Kinsale, lye Southwest and northeast, distant 3 leagues and a half.

The Haven of Kinsale, lyeth from the Old-head, North northeast, and going in, you must kéep Bane Castle open of the West land.

The Old-head and Cape Clear, lye West by South, and East by North, and are distant 14 leagues.

Cape Cleare and Silly, lye East Southeast, and West Northwest, distant 50 leagues.

There lyeth from Fasten a Haven called Crocke Haven, and is from it Northwest distant 4 leagues.

There is a Haven called Scoll Haven, which lyeth from Fasten, North and by West, distant 5 leagues.

There is a Head-land, halfe way betwixt the Old-head, of Kinsale, and Balcemore, which is called Kendonetedo, and it lyeth Northwest by West, from it is a good Haven called Clendor, there is a high Land to the Eastward, you must go aboard that high Land. and so into the Haven. There is a rainy of Rocks on the Westland, that goeth to the Eastwards; therefore kéep the East side, and when you come in, Anchor before the Castle: there lyeth West Northwest from the said head, a good Haven, called Castle-haven, 4 leagues from it, and if you come out into the Sea, and méet with the Staggs, you must goe Northeast, into Castle-haven, and in the entry, there is an Iland, which you must leave on the East-side of you, and another flat Iland which your must leave on the West side of you; you may goe dry at low water from it to the maine, for it is very nigh to the West land, but be bold on the Easter Iland, and go right with a Chappell that lyeth on the East side of the maine Land, and when you are thwart of the Chappell, you shall sée a Castle on the West-side, and thwart of the Castle you may enter in 12 fatham, it is from the Staggs, three and a half leagues.

You must understand, that the flood shuts from *Dourze* to the Old-head of Kinsale, North northeast, and the Ebbe to the contrary, and from the Old-head to the Tower of Waterford Northeast, and Southwest, and from the *Dourze* to the Northwards, North northeast, and South-southwest.

If you will go in betwixt the Cash and the North-head of the

grounds

grounds in Dalky, you must bring a round hill that stands like a Sugar-loafe N. Northwest, and then you shall have 10 fatham: It flowseth southeast alongst the Channell and the barre of Poulbacke, there is eight foot water upon it at low water, and three fatham at full Sea: your Barre lyeth South and North, and you shall have in the road of Poulbacke, 14 foot at low water.

To sayle from Dalky, to the road of Poulbacke, you must keepe a small Rocke open, a hand-spicke length, and when you come to the Barre, you must lye West Southwest up into the road within the Beacon, then must you Anchor in foure fatham at high water, for there be two Hils on the South-side, a high hill and a low round hill: bring them both in one, and then you be in the best of the Road. A South southeast Moon makes a full Sea.

# A Note for going into *Milford*.

IF you come for Milford, you must leave all the Ilands to the Westwards, and when you haue the Grasham North Northwest then the Haven beareth Northeast by North, and when you come into Dall Road, you may ride in three fatham and a half at low water, it floweth East by North.

Milfordgeeth in close under Cowein, and Scabon, to the Eastward, and when you come open of *Milford*, your shall see an Iland, like the Mawstone, which lyeth on the East side, and in Dall Road you may ride for all winds, the Small lyeth from the Grasham three leagues, and betwixt them lyeth a ledge of Rockes, which is dry at low water: it lyeth mid-way, and it is very dangerous comming between them.

# A generall and Compendious Tide-table,

shewing what Moon makes full Sea or high water in all theſe Places following.

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## Full Sea on the Coaſts of *Zutphen*, *Frizeland*, *Holland*, *Zealand*, and *Norway*.

At the Jutlandiſh Iles before the Rivers of Hever, Fider, and Elve. South, and N.

At Ancuiſen. S. and N.

The Ile of Urke before Delfe-Ile, at Embden, and all the ſhores of Flanders, S. and N.

Before the Maers deepe, E. and W.

At Hambrow and Antwerpe, E. and W.

Underneath Holyland, W. S w.

At Egmont and Harlem, Southeaſt

In the Breſon and Vourd, W. S. w.

Before the Eaſterne and Weſtern entrances of the Emes, or River of Embden, before all the Coaſt of Frizeland, and the Fly, E. S. E.

Before the Gheſt of Texell, W. S. w.

Upon the Flats of Weſt Frizeland, Wyering, and Amſterdam, S. W.

Without the Bankes of Flanders, S. W.

Dotretcht and Zierick Sea, S. W.

Roterdam, and from Harlem, to the River of Maes, S. W.

At Wardhouſe, E. and W.

At Brihac, E. S. E.

Cape Gallant, S. by E.

The Havens of Yotland and Norway, S. and N.

At Corpus Chriſti Point. S. S. W.

Before the Fen in the Chennell at Horn, Edam, Ile of Gore, before the Maes, before Camfer, and Terver, S. S. W.

Before the Willing, and all the Coaſt of Zealand, S. S. W.

North-Cape and Blangbrow S. w.

Fox-noſe, and St. Nicolas road, W. S. w.

Full

# Ful Sea on the Coaſt of *France*, *Spain*, and *Portugall*.

At Blackneſſe, Armuy, Rammekins, and Camfer, *S S.w.*

Within the Foſſe of Caen, *S.S.E.*

Calice-road and Diepe, *S.S.E.*

At Bolein, Calice. Gravelin, and Dunkerk, half tide, *S.* and N.

The Iland of Baſſe, *S.E.*

Within the Seyne before the Caſquets: and before Garnſey. *S.E.*

Before Cherborough, and the Raſe of Blanquet, *S.* and N.

At Newport half tide, *S.* and N.

At Seyne-head, *S.S.w.*

At Garnſey, and before Saint Poule, W. by *S.*

Bell Ile, and Holy Ile, *S.w.* by *S.*

Without Uſhant, and before Burdeaux, E. and W.

Britain, Penmarke, Poitou, and Gaſcoigne, *S.w.*

Raſe of Fontenes, *S.w.* by W.

Bloy and St. Mathews, W. *S.w.*

Abrowarth, and St. Mallowes, W. by *S.*

Before the Killiats, S.W.

Portwiſe, and before the River of Burdeaux. *S.w.*

From the Raſe to the Polehead, *S.w.*

Before the River of Naunts, and before the Bay, *S.w.*

In the Bay within Uſhant, W. *S.w.*

At the Sept-Iſles, and at Calice, in the Creeke, W. *S.w.*

Within the River of Roan, and from the Pole-head of Burdeaux, to the Foreland of Fonntains before Brovage, in the River within all the Havens aforeſaid, it floweth, *S.w.* by W,

At St. John de Luze, *S.S.E.*

At Concalo. and St. Malo, E. and W.

At Cape St. Maries, E. by E.

On all the Coaſt of Biskay, Galizia, Portugal, and Spaine, it floweth Southweſt and N. eaſt.

## *Scotland.*

In S. Magnes ſound, *S.E.* by E.

At Faire Iles, *S.E.*

In the Frith, *S.S.E.*

Faire Iſle Roads. *S.* by E.

At Orkney, *S.* E.

## *England.*

At Barwick, it flowes, *S.S.W.*

At the Staples half tide, N.E. by E.

At Howncliffe-foot, halfe tide, N.E. by E.

At

At Flambrow-head one quarter tide, E.NE.
At the Shoo, S. and N.
At Tinmouth a quarter tide. S.W.
At the Sporne, W. by S.
Newcastle and Humber, W. by S.
Winterton, E.S.E
Black-tayle, and the Nowre, S. by W.
Blackney and the Shields, E. & W.
Yarmouth, S.E. by E.
Orford and Albrow, S.E. by S.
Whitbay and Robin-hoods bay, S.W.
Before Hartlepoole, S.W.
Scarbrow one quarter tide, W.S.W.
Hul and Lin halfe tide, E. and W.
Before Humbers mouth, N.W.
At Burnham one quarter tide, E. and W.
Crosner, S.E.
At Leistow a quarter tide, S.S.E.
Harwich and Dover, S.S.E.
Harwich within, S. by E.
South Forland, S.S.E.
Before Margate and Thames-mouth, S. by E.
Leigh and Kentish-knock, S. & N.
Spits and along the Swine, S. and N.
Betwéen Tinmouth and Flambrow-head, S.W.
Betwéen Flambrow-head, and Bridlington bay, S.W. by W.
Betwéen Bridlington and Lawrenas, W.S.W.
Betwéen Lawrenas and Cromer, along the Well halfe tide, E. and W.
Betwéen Cromer, and Yarmouth road, S.E.
Betwéen Laistо road, and Orfordnesse, S.E. by S.
Betwéene Orford and Orwell waves, S.S.E.
Betwéen the Naze and the Ware-head of Colne. S. by E.
At the West end of the Nore, S. by W.
Rochester and Malden, S. by W.
At Gravesend, S.S.W.
London and the middest of the Heads or straights, S.W.
At the North Forlands, S.S.E.
At Beachy, S. and N.
Seaven Cliffes S.E
In the Downes, S.S.E.
In the Camber and at Gore-end, S. by E.
At Cambernesse, and at the Needles. S.E. by S.
In Cambernesse road, S.S.E.
Portsmouth, Hampton, and the Isle of Wight, S. and N.
In the Offing from the North Forland, to the South Forland it runneth, halfe tide, and from the South Forland to the Nasse. it runneth halfe tide, and halfe quarter tide, and

and from the Nesse to Fairly one half tide, and from Fairly to Beachy, one quarter tide under other.

At Portland Road, E.S.E.
At St. Ellens, S.E. by E.
Within the Race of Portland,
At Poole, in the Haven, at Home-head, and thwart of Plymouth and Dartmouth. S.E.
At Waymouth, E. and W.
At Famouth, Foy, Fourne, Plimouth, and Dartmouth, W. by S
Brillow and Foulneſſe, E. by S.
At the Start, E. by S.
Mosshole, W.S.W.
S. Davids head, E. and W.
Milford haven, E.S.E.
Ile of Man and Çatnes, S.E.
Three leagues of the shore, at the Lizard to the shore, and to the Lands-end, E.S.E.
Within Torbay, and in the bay of Carnarven, W. by S.
At the mouth of Severn, W. by S.
At the Moonles, W. by S.
From the Lizard, to the Sorliggs, W. by S.
Before Silly in the Channell, E. and W.
At Silly half tide, S.S.W.
Within Mouths Bay, and in the Mouth of Wales and Severne, W.S.W.
At Lundy and the Holmes of Brissow, E. and W.
In the Sleeve, between [illegible] Ushant, [illegible].
Note that the flood sets in at the East end of [illegible] a Southeast from in the Road of Dungeneſſe, South Southeast, but without in the Channell a [illegible] full Sea: from the Seamew and in the broad [illegible] it and Ushant the [illegible] East Northeast, and West southwest.

## Ireland.

At Caldy, W. by S.
Waterford and Abermorlis, E. and W.
At Cape Cleer, E.S.E.
Mackrels Caſtle S.E. by E.
Dublin and Lambay, S.E. by E.
Dunbar and Kilſien, S.E.
Dungerum, Kinſale, Corke, Waterford and Balecanoe, W.S.W.

# The Course of all the Coasts of *Holland*, *Zealand*, *France*, and *Spain*, upon what Point, and what distance they are.

From the Isle of Texell unto Egmont, S. & by W. leag. 5
From Egmont unto the Maze, S.S.W.l. 11
From the Maze to the Wieling. S.W.l. 12
From the Wieling unto the head of straight between *Dover* and Calice, W.S.W.l. 18
From the Isle of Wakeren or Flushing unto Calice, S.W. & by W.l. 22
From Blackneſſe unto Deepe, S.S.W.l. 12
From *Deepe* unto Seyn-head, or the River of Seyne, W.S.W.l. 11
From the Seyne-head to the River of Cane, S.W.l. 8
From thence unto Cape de la Hague, N.W.l. 12
From thence unto the Caskets, W. & by N.l. 8
From the Caskets to Garneſey, S.W. & by W.l. 4
From Garneſey to St. Malo, S.S.E.l. 10
From Garneſey to the Sept-Iles, S.W. & by S.l. 12
From the ſeven Iſles to St. Poule, W.S.W.l. 8
From thence to the Fourne, W.S.W.l. 10
From the Caskets, to the Fourne, S.W. & by W.l. 34
From the Fourne, to St. Mathews point, S.S.E.l. 3
From thence to Fouweenau or Fouteynes, S. & by E.l. 5
From Ushant to the Seames a Sea-board it, S.l. 7
From Fouweenau to the Weſt Penmarques, S.E.l. 7
From thence unto the Isle of Croy, E. & by S.l. 12
From the Weſt Penmarques, to Bell-Iſle, E.S.E.l. 15
From thence to Heys ſomewhat more eaſterly, S.E.l. 12
From thence again untill within Piquilier, E. & S.l. 10
From thence again unto Croyſill, E. & by S.l. 9
From Piquilier unto Heys, S. & by W.l. 5
From Heys to the Killiats, E.S.E.l. 10
From the Isle of Heys to Porthuis, S.E. & by E.l. 12

From

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| From St. Martins Iſland to the Burning Iſle, | S.E. & by E.l. 3 |
| From the Burning Iſle to the Oyſter point, | S.S.E.l. 3 |
| From St, Martins Iſle to the Mouth of Cordan, | S. & by E.l. 12 |
| From thence unto Bayone, | S & N.l. 28 |
| From Bayone to Orio, | W.S.W.l. 6 |
| From Orio unto S. John de luz, | E.S.E.l. 6 |
| From Orio unto S. Andrew. | W. & by S.l. 20 |
| From St. Andrew to Cape de Pennas, | E. & W.l. 30 |
| From Cape de Pennas to Ribadeo, | S.W. & by W.l. 12 |
| From Cape de Pennas to Ortegall, | W. & by W.l. 20 |
| From Ortegall to Ribadeo, | E.l. 14 |
| From Ortegall unto the Iſle of Cizarga, | S.W. & by W.l. 13 |
| From Cizarga unto Coronna, | E.S.E.l. 6 |
| From thence to Cape Coriana, | W.S.W.l. 10 |
| From Coriana to Cape Fineſterre, | S. & N.l. 3 |
| From Fineſterre unto Bayone, | S.E. & by S.l. 14 |
| From Bayone unto Port de Port, | S.S.E.l. 18 |
| From Port de Port to Aveire, | S. & N.l. 8 |
| From Aveiro to Montega, | S.S.W.l. 5 |
| From Montega unto Barlings, | S.W.l. 12 |
| From Barlings unto Roxende, | S. and by E.l. 12 |
| From Roxende to St. Uves point, | S.E. & by S.l. 8 |
| From thence unto the Cape of St. Vincent, | S. & N.l. 24 |
| From thence unto Pharo, | E. & W.l. 14 |
| From Pharo unto Lepe, | N.E. & by E.l. 12 |
| From Pharo unto Salees, | E.N.E.l. 18 |
| From Salees to Chipiona, | S.E.l. 8 |
| From Chipiona to Calis Malis, | S.E.l. 16 |
| From Calice unto the ſtraight of Gibralter, | S.E.l. 8 |
| From Cape de Cantin to the Iſle of Madera, | W.l. 104 |
| From Cape St. Vincent to Madera, | S.W. & by W. l. 115 |
| From Roxende to Madera, | S.W.l. 130 |
| From Roxende to the Iſle of Tercera, | W.l. 210 |

# The Courses of *England*, *Ireland*, and *Scotland*.

From Boecknes unto Leeth in Scotland, S.S.W.1.
From Leeth unto Barwick, S.S.E.1.8.
From Barwick unto the Holy Ile, E.S.E.1.4
From S^t. Abbes-head, to the Eastern end of Farne Iles, S.E.1.
From the Iles of Farne, to the Tees mouth, S.S.E.1.
From the River of Tees to Flambrow-head, S.E. by E.1.
From Flambrow-head, to Blackney, S.E.1.
From Blackney unto Winterton, S.E.1.8
From Winterton unto Lestoffe, S. & by E.1.8.
From Lestoffe unto Orford Haven, S.1.
From Orford unto the Foreland, S.S.E.1.
From the Foreland to Dover, E.1.
From Dover to the Shingles, or the Nesse point, S.W. & by W.
From the Nesse point unto the Beache, W.S.W.1.
From the Beache to the Ile of Wight. W. & by S.1.
From Wight unto Portland, W. & by S.1.
From Portland to the Start point, W.S.W.1.
From the Start unto Ram-head point, W.N.W.1.
From Ram-head unto the Dodmans point, W.S.W.1.
From Dodmans to the Lizard point, S.W. & by W.1.
From the Lizard to the Iles of Silly, W.1.
From the Lizard to the Lands-end, W.N.W.1.
From the Lands-end to the Ile of Lundy, N.E.1.
From thence unto the Holmes of Bristow, N.E. & by E.1.
From thence unto the Ile of Caldy, W.S.W.1.
From thence to the Iles of Sakeys, on the Coast of Ireland, W.N.W.1.

From Sakeys to Cape Cleere. W.S.W.1.
From Cape Cleere to the Ile of Dorsey, W.1.
From the point of *Dorsey* to the Ile of Blakem, N.N.W.1.
From Blakem unto the Iles of Arrant, N.N.E.1.
From the Iles of Arrant to Galwick or the Galse in Ireland, E.N.E.1.

# Of divers and sundry Courses over the Western Sea.

From the Texell on the Coast of Holland to Flamborough,
W.N.W.l.45

From Texell unto Winterton in Norfolke,
W.l.32

From the Ile of Texell unto Lestoffe,
W. & by S.l.28

From the River of the Maze in South Holland, unto Harwich,
W.l.26

From the said Maze to the Foreland of England,
W. & by S.l.25

From the Marsdeepe in North Holland, to the said Foreland,
S.W.l.36

From the said Marsdeepe to Calice,
W. & by S.l.38

From Dover unto Bologne,
S.E.38

From Boloigne unto the Beache,
W.l.16

From the Beache to Diepe in Normandy,
S.E.l.18

From Diepe unto the Ile of Wight,
E.S.E.l.38

From Wight to the Sein-head in Britaine,
S.E.l.20

From the said River of Seyne to Scotland,
W.N.W.l.30

From the Ile of Wight unto the Caskets,
S.W.& by S.l.14

From Garnesey unto St. Malo in Britaine,
S.S.E.38

From the Caskets to Portland,
N. & by W.l.10

From the Caskets to the Start point,
W.N.W.l.16

From the Start to the Sept-Iles in Normandy,
S.S.E.l.24

From Start to St. Poul in Normandy,
S. & by W.l.22

From St. Poul to Portland,
N.E. & by N.l.

From the Fournes to Ram-head,
N.N.E.l.

From the Start point unto Ushant,
S.W. & by S.l.32

From the Fournes, to the Lizard,
S. & N.l.22

From Ushant to the Iles of Silly,
N.N.W.l.26

From the Sorlings to Milford Haven,
N. & by E.l.25

From the Sorlings to Wexford in Ireland,
N.N.W.l.34

From the Sorlings to Cape Cleere,
N.W.l.42

From Cape Cleere to Cape de Finesterre,
S. and N.l.130

From the Lizard to Cape de Finesterre in Galicia,
S.S.W.l.112

From

From Ushant unto the Isle of Cizarga in Galizia, S.S.W.l.85
From Ushant to Laredo in Biscay, S.S.E.l.85
From the Seame Rockes to S. Sebastian in Biscay, Southeast and by S.l.10.
From Ushant againſt to Cape de Pannas in Biscay, S. & N.l.70
From Belle unto Ortegall in Galizia, S.W.l.75
From St. Martins Isle to Ortegall, W.S.W.l.85
From Ortegall to Cape de Corinna, S.W. & by W.l.24
From Cape de Finesterre to the Isles of St. Michael, W.S.W.l 185
From St. Michael to the Isle of Tercera, N.W.l.26
From Cape de Finesterre to the Isle of Madera, Southwest & by W.l.190
From Madera unto the great Isle of Canary, S.E.& by E.l.60
From Cape de Finesterre, to Bayone in Galizia, S.E. & by E.l.15
From Cape de Finesterre to the Isle of Barling, S.& N.l. 50
From the Barlings in Portugal to the Isle of Canary, S.S.W.l.170
From the Isle of Madera to Calis Malis, E.N.E.l.150
From Calis to Cape de Cantin, S.W.& by S.l.65
From Cape de St. Vincent unto Cape de Cantin, S.& N.l.62
From Cape de St. Vincent unto the Isle of Madera Southwest, & by W.l.120
From Roxe in Portugal, unto the Isle of Tercera, E. & W.l.210

# The Courses of *Norway Swetbland*, and East *Finland*.

FRom Schuytenes to the Vesteen, S.& by E.l.4
From Vesteen or Wostone to the Jeddor, S.S.E.l.4
From the Jeddor to the Vorsteene, or Forstone, S.E.l.5
From the Forstone to the *Noes*, E.S.E.l.6
From the *Noes* unto Reperwicke, E.N.E.l.8
From Reperwick to Mardon, N.E.l.10
From Mardon unto Jofferland, N.E.l.8
From Jofferland to Langhesoundt, N.N.E.l.1
From Langhesoundt to Ferderoer, N.E.& by E.l.6
from

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| From Ferderoer unto Soen-water, | N.1.8 |
| From Ferderoer unto Roegbe, | N.N.E.1.4 |
| From Ferderoer unto Akersound, | *E.N.E.*1.6 |
| From Akersound to *Maerstrand*, | S.E.& by *E.*1.4 |
| From Pater noster to Nydrinke, | S.E.1.8 |
| From Nydrink to Waersbergh, | S.*E.* & by *E.*1.4 |
| From *Waersbergh* to Swedoroer, | S.S.E.1.6 |
| From Swedoroer unto Col, | S.S.*W.*1.3 |
| From Col unto Lapsand, | S.E.1.3 |
| From Lapsand unto Ween, | S.S.E.1.2 |
| From Ween to Drakeriffe, | S. & by E.1.7 |
| From *Drakeriffe* to Steeden, | S.& by W.1.4 |
| From *Steeden* to the Southend of Bornholme, | *E.* & by N.1.15 |
| From Borneholme unto Anno, | N. & by W.1.8 |
| From Anno unto the Rockes, | N.*E.*1.8 |
| From the Rockes untill within the Calmersond, | N.N.E.1.10 |
| From Calmersond to the Swedish Jonckfrow, | N.N.*E.*1.8 |
| From Jonckfrow to Landscoor, | N.N.*E.*1.8 |
| From thence untill before Dury-haven, | N.E.& by E.1.8 |
| From the Stockholmes Shoes to View of Abo, | N.E. & by N.1.24 |
| From View unto Lutis Usclusses, | E.N.E.1.28 |
| From the Uschares, to the Isle of Tutuago, | E.& by N.1.30 |
| From thence unto Somere, | E.& W.1.9 |
| From Somere unto the Red-hole of Wiburgh, | N.E.1.9 |
| From the Red-hole to Tradland, | N.E.& by N.1.2 |
| From thence unto Wiburgh. | leagues 2. |

The

# The Depth and Soundings, neer diverse Provinces. And first of *Gascoigne*, *Poicton*, and *Britaine*.

Without the Riuer of Burdeaux, there is 14 fatham depth, but when you come within the sight of Cordam Tower, 30 fatham.

Over against the Coast of Poictou, 16 leagues, without Oleron, you haue 35 fatham, but comming néer the land 8 leagues from the shore, you haue 35 fatham: In the Channell betwéen Portnuit, and Heys, it is 30 fatham, and as much in the Channell of Heys: as also betwéen Heys, and Belle: without the Channell is 35 fatham, but within 25: without Heys two kennings off, there is found 45 fatham.

Twenty two leagues Southward off Belle, is 70 fatham, but 9 leagues from the Northwest point of that Iland; towards the Southwest is 60 fatham: and over against the midst of Belle, in 40 fatham depth, you shall see land. Betwéen points betwéen Belle and the Seames, you must leaue no néere, then 50 or 45 fatham, if you sayle from Belle West and by South: when you are against Gloyland, you shall find 60 fatham depth, without and within the Rock which stands off Gloyland; to the Southwards, you haue 40 fatham water: in 60 fatham depth without the Westermost Pennaikes, you may sayl Northwest by West without the Seames, but by night come no néeter then in 55 fatham, for the ground is grosse and red Sand, and full of red Flints: halfe a league West southwest off the Seames, is a ledge of Rocks, where you haue 7 fatham depth, but betwéen the Seames and the Rock is 50 fatham.

In the Channell betwéen the Seames and Ushant, is 55 fatham depth, the ground is grosse and red Sand, with little round stones red and black: néer to Ushant is 45 fatham, but within it is of a variable depth: Southwest almost 6 leagues off Ushant, you haue 70 fatham, and the ground is fine white Sand, with little white shels, and other small things like néedles, and then is

Ushant

Ushant, East from you: but if the sand be grosse and white, mingled with great and white shels, then it is Southeast to you: but if you doubt of these Grounds go northerly, if your Sound be deeper, then are you towards the Seames, but if not so deep, then are you in the channell almost nozth of Ushant.

Between Vshant and Obuerack, in the trade, it is 60 fatham depth: Between Vshant and the Sorlings in the middest of the Channell there is 70 fatham: between the Seames, and Vshant, in 70 fatham water, the ground is of little black stones easie to be broken, and of yellow earth and clay: but if you finde red and hard sand, go Northward, till you happen on white sand mingled with long streaks and then you are in the Channell.

If from Cizarga you sayl North Northeast in the Spanish seas, towards Vshant, and find your self in 80 fatham, you are 14 or 15 leagues off Vshant, but comming neerer, you shall have 70 fatham water, and be 10 leagues from Vshant: but if you finde the ground to be yellow shels, and little black stones, then are you towards the Seames; therefore you must with the tyde, bear off Northward, to shun Vshant, untill you find white sand, and things like needles, for such are the grounds of the channell.

Between Vshant and the Ile of Base, when you sayl at 4 fatham water, you are 4 leagues off the shore, but by night come no neerer than 25 fatham. When you are two leagues of Obverack, you shall find 25 fatham, depth, but 8 leagues off the Sept Ilands, you have 55 fatham.

A league without the Rockes of Obverack, there is a blind or hidden Rock: so that if you were to sayl upon a bord between the Fournes and Obverack, come no neerer the blind Rock than 40 fatham, but Eastward, you may sayl in 30 or 25 fatham.

If a Ship sayling West, S. W. and Southwest by W. off Silly, at 80 fatham water, be found to be under 49 degrees, 15 minutes of Altitude, she is 26 leagues from Land, and must goe East and by North, till she get 66 fatham water; for then she is in the Channell between Silly and Vshant, and then if she be bound for England, she must sayl more Northward and between the Lands end and the Lizard, she shall have 55 fatham depth.

## The Soundings and Grounds between *Ireland*, *England*, and *Normandy*.

THrée leagues without the Iles of *Dorsey*, néer Ireland, it is 45 fatham déep: In the Channell betwéen Dorsey and Cape-cleare, is 42 or 43 fatham, the Channell from Cape-cleare to Saltees, hath 45 fatham, but two leagues off Ireland, it hath but forty; Betwéen Saltees and Milford, it is 44 fatham déep, and betwéen Lundy and Silly, is 38 fatham. In the mid-way betwéen Silly and Milford is 44 fatham, but North of Silly 40 and 42, and néer England, by the Lands-end, the Channell is of 50 fatham déep.

Comming from Cape Finisterre, sayling N. N. E. if you have 80 fatham, you are 20 leagues off the shore, and the ground is small black stones with great red sand: In the same course, when you have but 60 fatham, you are within 12 or 14 leagues off the shore, but shall not so soon kenne land, as you thinke for: you shall a great while have 60 fatham: being at the N. parts of the Channell about Silly, betwéen Ushant and Silly, the channell is 70 fatham: on the S. side of Silly, the ground is small red stones, and fine white sand: Over against the Lizard, and Falmouth four leagues from shore is 52 fatham: betwixt Foy and Plymouth sound, in the Channel nighest is 60 fatham betwéen the Lizard and the Start, beare no nearer the shore than 35 fatham, you may cast Anchor in the trade or Channell in 25 fatham, and so you shall lye within the Foreland stream: between Plymouth, and the Sept-Il:s, in the middest of the Channell is 55 fatham, but 4 leagues S. S. W. off Plymouth, is but 35 fatham: S. S. E. off the midland of the *Start* is 45 fatham, but from thence 5 or 6 leagues S. E. is 54 fatham: in the Channell betwéen the Caskets and Portland is 40 fatham and a league N. off the Ile of Aldernay, is a hole or pit 80 fatham déep, all the rest of the channell betwéen Portland and Aldernay, is of equall depth, viz. 40 fatham: when you are within kenning of Portland your sounding is 34 fatham: and two leagues of Wight 36 fatham; also two leagues Eastward of Beachy, betwéen Picardy and Wight, the

Channell

Channell in the midſt is 38 fatham: betweén Winchelſey and Picardy is 24 fatham, the ſhoalds betweén the heads called the Urowenſand, hath but 3 fatham and a half, but on the Southſide of it is 24 fatham: and in all the faire way betweéa Zeland and *Dover*, it is 24 fatham déep.

## Depths of the North Sea from the *Foreland*.

IN the Channell from England Foreland, and ſands of Flaunders you have 24 fatham déep: but 3 leagues North Weſt by Weſt, off the Countrey of Zierrickze, called Bothrecke, it hath but foure fatham depth without the ſhoald: the Channell of Zealand, is 26 fatham N. W. off Harlem, 8 or 9 miles within the Sea, there beginneth a ſhelf called *Debreede Verthien*, reaching alongſt the Coaſt of Holland, to the plain of Arreland, where it endeth: Over againſt Harlem and Egmont is 13, 14 or 15 fatham, and the ground is full of Daſe, mingled with black ſand like Muſtard-ſéed: the ſaid ſhelf hath 15, 16 or 17 fatham depth: Betwéene Texell and Ulyeland, where the ground is groſſe red ſand, 6, or 7 leagues from the ſhore, for there the ſhoald is narrower then it is toward the South end of the Channell: without the ſhoald betwéen Zealand and Texell is 26 fatham deep, as farre as the ſhoald which the Fiſhers call *Dog*-ſand. In the Channell on Englands ſide, over againſt Yarmouth is 35 fatham, but againſt Flamborough and Scarborough point 38 fatham, whereas the white ſhelf called *Dog*-ſand beginneth (reaching into the North Seas to the Channell of Helichland, this ſhoald where it is within kenning of Flamborough point) hath but 9 or 10 fatham, but when in the ſame Sand you find 12 fatham, then Texell is from you Southeaſt almoſt 30 leagues, but when you come to 16 fatham, then are you within 21 leagues, South ſoutheaſt of Ulyeland.

A Ship that comes from the Riffe, finding 18 fatham depth, on the aforeſaid Sand, is then 29 leagues South and by Eaſt off Ulyeland, but at 22 fatham you muſt then ſayle towards the Ulye, South and by Weſt, and South ſouthweſt, but if in the Channell of Helichland, 24 or 26 fatham be found, then muſt you ſayle

Southwest, and Southwest by south, and then you come to the Shelingh: but if in Helichland Sound, you have 27 fatham, then are you altogether to the Eastward of it; betwéen the Riffe, and the Doggersand the Channell is 26 fatham: without the channell Westward, it is 32 fathom dæp.

A Ship that comes out of the English straits, or out of Zealand, having at the Riffe 24 fatham, is from the Naes in Norway, 18 leagues North and by east, but having 20 fatham, is but 16 leagues from it North, and finding but 18 fatham, is then 18 leag. off it North by West: The course from thence to the Holmes, is 12 leagues North by East: frō thence to the point of Schagens, is 18 leagues Northeast by East: there is a Rock of one fatham depth Northeast, and Northeast by East off the Holmes 2 leag. from shore.

## Depths neer *Jutland* and *Ameland*.

IN the Sea without Jutland, a mile from Dodenbergh, is a Banke called Reese-horne, stretching out 8 leagues West by South, in some places but thrée fatham déepe; and in some places may be sailed over, and become a Road for a Northwest, and a north wind in 20 fatham; From Amland towards the Sea, the ground is grosse sand, red and black mingled with shels; thence Southwards in 16 fatham, sayling thrée hours, you shall come to the smoth Sea of Ameland, where the ground is fine sand with shels: North from Schellingh in 24 fatham, is fine white sand, and in 8 fatham white and black sand mingled, Ulyeland hath white sand with shels, and thin black sand in 16 fatham depth: From the West end of Ulyeland, is great and red sand mingled with black like unto Mustard séed: about six or seven leagues from shore at the East end of Schellingh, to Seawards at 18 fatham, is fine white sand mingled with black, having in it things like needles. Over against Borke in the Westerne Emes at 17 or 18 fatham depth, land may be seene: the ground is grosse gravelly sand: At 14 fatham may Ameland, be kend, but Schellingh at 16, and Ulyeland at 15 or 16 fatham water. At the North Hooke of Texell, land may be be seen at 16 fatham. Holland at 14 or 15. When you sayle within the shoald called the Breduirchien,

duirchien, which beginneth Northwest of Harlem, and stretcheth along the coast of Holland, to the West end of Vlyeland, it is 7 or 8 leagues from the shore.

## Soundings and Grounds neer the *Schaw*.

A Great league West by North from the Schaw, is 35 fatham depth: North northeast a great league off the corner of this Point, is 38 fatham, and when the Point is northeast from you, then you have 17 fatham. Between this Point and Leson the Channell in 20 fatham deep, and the ground like clay or dirt: Betwixt Anhout and Waersbergh, in the midst of the Channell is 22 fatham water: between Leson and Anhout, the ground is fine and stony: neer Waersberg is a shoald of 17 fatham depth: between Anhout and Coll is another shoald of 17 fatham, where sometimes it is troublesome like a Whyrl-pool.

## Depths of the Eastern Seas,

BEtween Oeland and Gothland, the soundings are unequall, sometimes of 20, sometimes of 23 fatham, the ground grosse and black stony sand like Pease: when the South end of Oeland is 2 leagues from you Westwards, you have 27 fatham, where also you may gage water: but when the Chappell of Sudernoorden beareth West northwest off you, then have you 31 fatham, and ground fit to gage water: Over against the Rock in the fair way is 52 fatham, and a clay ground, but fit for gagins: Betwéen the greater and lesser Carta, is 14 fatham, under which is a safe road for Ships there is a shoald betwéen Huubergh and Ostergard 24 fatham depth, the ground great red sand, but hardly from thence can you ken Gothland out of the top: there is also to the Eastward another shoald of 36 fatham, which when you are past you have more than 40 fatham water: when the point of Righ is thrée leagues Southeast from you, then have you 30 fatham: but when it is from you half a league South southeast, you have but 15 fatham, and the ground is white sand: but when it beareth West a small league from you, then you shall finde 16

fatham

fathom: Over against Heel halfe a leagne from the shore, it is almost 3 fatham deep: the road for Shipps at Heel, hath 25 fatham depth: Betwéen *Moan* and Falsterbourne is 14 fatham depth: betwéen Stead and Falsterbourn in the very Channell, is but 12 fatham déep: néer Falsterbourn it is full of shoalds, but néer Stead, you have 13 fatham water: Betwéen Darl-riffe and Southolmen which is more shoaldy, there is 5 fatham wanting two foot: from thence toward the South it is something déeper than 6, 7, 8, 9, or 10 fatham.

## A note of certain and most dangerous places in the Sea.

THe principallest and most perilous of all is the Mael-stream-well or Slorp, called the *Mousk*-stream: which lyeth on the back-side of Norway in 68 degrees on the North side of an Island or Rock called Weeray. This Well draweth the water unto itself, during the whole flood (which is the space of 6 houres and 12 minutes) with such an indraught and force, and with such a noyse through the tumbling and falling of the waves and streame one upon the other, that it is rather to wonder at, than to write of. So that during that time, within the space of more than two leagues, round about that Rock of *Mouske*, (under which that water floweth) no Ship or other vessell may come néer, for they should to their utter destruction be drawn into it, and swallowed up: but all the time of the Ebbe, the water is so strongly cast up againe, that no kind of substance or Metall, how heavy soever it be, can there sinck: So that our Northern Fishers at that time do with their Jollen or Fishing boats, take many and strange formed Fishes, which they draw into their Boats with Hooks and Lines, which they have ready laid for that purpose: for that during the Ebbe, they cannot return into the Gulph, nor get under water by any means.

The Northern people that inhabit about those Rocks, doe think that stream passeth a way underneath a part of Norway, under the North bottome in East Finland; because that in that place there is likewise such a Mael-streame (though not altogether so

so strong nor dangerous) where the like Fishes are taken: and the water is in like sort troublesome, as it is underneath, and about the Rock of Mouske.

Whereupon many experienced Pilots do call the said Slorp, The Navell of the Sea, which causeth the courses of the Ebbes, and Flouds about all the Lands that are on this North side of the Equinoctiall, as the most convenient place for that purpose, to spread the waters South, North, East and West; that is to say, Northerly towards the Pole Artick, South easterly on the back-side of Russia and Tartaria, and toward the straight of the great South sea, called Mar del Zur, wherein the Spirits of Ilands (called the Moluccas, néer the Equinoctiall) are lying Southward the North-sea of these Low-Countries: As also on the back-side of Scotland and Ireland, towards the Spanish and Atlantick-Seas, and towards the Northwest beyond Iseland, towards Frobishers-straights, where it is thought the way unto Catay may be found.

There are moreover to be feared upon the Western Seas, very dangerous streams and Gulphes, as in the Race of Portland, where oftentimes happeneth such turning and tumbling of Waves, and Streams, that the Ships which passe that way, are many times in great perill.

Moreover, the Race of Branquert betwéen Normandy and the Iles of Aldernay, roareth and rageth so dangerously, that many Ships fall therein headlong so déep, that suddainly they are swallowed up, and sunk to the very bottome,

The Race of Fountney is more dangerous than all these, wherein many small Vessels and Barkes of Britany, and of other Countries, are suddenly devoured and cast away: and the entrance of the Garrone, called the River of Burdeaux betwæn the Towers of Cordam, and the Southern and Northern Asses, is likewise very perilous, and many Ships do often perish there, if the Pilots be not skilfull and well acquainted with the place.

And therefore being the most full of danger, it behoveth each Pilot or Master to have especiall knowledge thereof, and great care to prevent the danger that may ensue unto them thereby.

The

*The four Terms.*

*Hilary* Term, begins January 23, and ends February 12.

*Easter* Term, begins 17 dayes after Easter day, and ends the Munday before Whitsunday.

*Trinity* Term, begins next Friday after Trinity-Sunday, and ends on Wednesday 19 dayes after.

*Michalmasse* Term, begins the 23 of October, and ends November 29.

## A brief explication of the severall parts of this following *Kalender* or *Ephemerides*.

THe first Page contains an Almanack for 24 years to come, shewing the Prime, Epact, Sunday-Letter, Leap-year, and all the principall moveable Feasts.

The following leaves shew the 12 Moneths of the Year in their order, and each Moneth is divided into severall Columns or spaces, which are alike in all the Moneths.

In the first, is set down the Prime.

In the second, is set down the Hour and Minute of the New Moon for 19 Years following.

In the third, the Day of the Moneth.

In the fourth, the Sunday-Letter, whereby you may know the Day of the Week.

In the fifth, is set down the Names of the fixed Feasts, and other Dayes of note, and in the voyd places between them is set down the time of the Sun-rising, and setting at *London*.

Then followeth 4 Sections, each one consisting of three Columns, wherein is set down the Longitude and Declination of the Sun in the Meridian of *London*, for the Years 1649, 1650, 1651, 1652.

Here-

# Hereafter followeth a most excellent, necessary and compendious Kalender, shewing the Prime, Epact, Dominicall Letters, Leap-years, and moveable Feasts, for 24 years; inclusively comprehending therewith the true day and houre of the Moon's Conjunction or Change, for 19 years to come, with the true Place of the Sun, and his Declination from the Equinoctiall, both Northwards and Southwards upon every Degree thereof, through the twelve Moneths of the Year.

| Years of our Lord | Prime. | Epact. | Sunday-Letter, | First Sunday in Lent | Easter day. | Ascensiō day | Whitsunday. | Trinity-Sunday. |
|---|---|---|---|---|---|---|---|---|
| 1649 | 16 | 26 | G | Febr. 11 | Mar. 25 | May, 3 | May, 13 | May, 20 |
| 1650 | 17 | 7 | F | Marc. 3 | Apr. 14 | 23 | June, 2 | June, 9 |
| 1651 | 18 | 18 | E | Febr. 16 | Mar. 30 | 8 | May, 18 | May, 25 |
| 1652 | 19 | 29 | D C | Marc. 7 | Apr. 18 | May, 27 | June, 6 | June. |
| 1653 | 1 | 11 | B | Febr. 27 | 10 | 19 | May, 29 | 5 |
| 1654 | 2 | 22 | A | 12 | Mar. 26 | 4 | 14 | May, 21 |
| 1655 | 3 | 3 | G | Marc. 4 | Apr. 15 | May, 24 | June 3 | June, 10 |
| 1656 | 4 | 14 | F E | Febr. 24 | 7 | 16 | May, 26 | 2 |
| 1657 | 5 | 25 | D | 15 | Mar. 29 | 7 | 17 | May, 24 |
| 1658 | 6 | 6 | C | Febr. 28 | Apr. 11 | May, 20 | May, 30 | June, 6 |
| 1659 | 7 | 17 | B | 20 | 3 | 12 | 22 | May, 29 |
| 1660 | 8 | 28 | A G | Mar. 11 | 22 | 31 | June, 10 | June, 17 |
| 1661 | 9 | 9 | F | Marc. 3 | Apr. 14 | May, 23 | June, 2 | June, 9 |
| 1662 | 10 | 20 | E | Febr. 16 | Mar. 30 | 8 | May, 18 | May, 25 |
| 1663 | 11 | 1 | D | Marc. 8 | Apr. 19 | 28 | June, 7 | June, 14 |
| 1664 | 12 | 12 | C B | Febr. 28 | Apr. 10 | May, 19 | May, 29 | Jnne, 5 |
| 1665 | 13 | 23 | A | 12 | Mar. 26 | 4 | 14 | May, 21 |
| 1666 | 14 | 4 | G | Marc. 4 | Apr. 15 | 24 | June, 3 | June, 10 |
| 1667 | 15 | 15 | F | Febr. 24 | April 7 | May, 16 | May, 26 | June, 2 |
| 1668 | 16 | 26 | E D | 8 | Mar. 27 | 1 | 11 | May, 18 |
| 1669 | 17 | 7 | C | 28 | Apr. 11 | 20 | 30 | June, 6 |
| 1670 | 18 | 18 | B | Febr. 20 | April, 3 | May; 12 | May, 22 | May, 29 |
| 1671 | 19 | 29 | A | Mar. 12 | 23 | June, 1 | June, 11 | June, 18 |
| 1672 | 20 | 11 | G F | Febr. 25 | 8 | May, 17 | May, 27 | 3 |

# January hath xxxj dayes.

| The Prime. | The time of the New Moon. H | M. | Monthday. | Weekeday. | The English Kalender. | Suns rising H.M. | Suns setting H.M. | First yeare, ⊙ in Capricorn. 1649 | Suns Longi D.M. | Suns Decli. D.M. | | Second year ⊙ in Capricorn. 1650 | Suns Longi D.M. | Suns Decli. D.M. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 8 | 23 | 24 | 1 | A | Circumcision. | 7 | 59 | 4 | 1 | 1 | 21 53 | 21 44 | 1 | 21 38 | 21 47 |
| 16 | 19 | 33 | 2 | B | | 7 | 59 | 4 | 1 | 2 | 22 54 | 21 34 | 2 | 22 39 | 21 37 |
| | | | 3 | C | | 7 | 58 | 4 | 2 | 3 | 23 55 | 21 23 | 3 | 23 40 | 21 27 |
| 5 | 3 | 14 | 4 | D | | 7 | 57 | 4 | 3 | 4 | 24 56 | 21 13 | 4 | 24 41 | 21 16 |
| 13 | 20 | 56 | 5 | E | | 7 | 56 | 4 | 4 | 5 | 25 57 | 21 2 | 5 | 25 43 | 21 5 |
| | | | 6 | F | Twelfth da. | | | | | 6 | 26 59 | 20 50 | 6 | 26 44 | 20 53 |
| 2 | 17 | 4 | 7 | G | | 7 | 53 | 4 | 7 | 7 | 28 0 | 20 38 | 7 | 27 45 | 20 41 |
| | | | 8 | A | Lucian | 4 | 8 | | | 8 | 29 1 | 20 26 | 8 | 28 46 | 20 29 |
| 10 | 5 | 46 | 9 | B | | 7 | 50 | 4 | 10 | 9 | ♒ 2 | 20 13 | 9 | 29 47 | 20 16 |
| | | | 10 | C | Sun in Aqua. | | | | | 10 | 1 3 | 20 0 | 10 | ♒ 48 | 20 3 |
| 18 | 1 | 54 | 11 | D | | 7 | 48 | 4 | 12 | 11 | 2 4 | 19 46 | 11 | 1 50 | 19 49 |
| 7 | 14 | 36 | 12 | E | | 7 | 46 | 4 | 14 | 12 | 3 6 | 19 32 | 12 | 2 51 | 19 36 |
| | | | 13 | F | Hilary | 4 | 16 | | | 13 | 4 7 | 19 18 | 13 | 3 52 | 19 21 |
| 15 | 13 | 17 | 14 | G | | 7 | 43 | 4 | 17 | 14 | 5 8 | 19 3 | 14 | 4 53 | 19 7 |
| 4 | 23 | 26 | 15 | A | | 7 | 42 | 4 | 18 | 15 | 6 9 | 18 48 | 15 | 5 54 | 18 52 |
| | | | 16 | B | | 7 | 40 | 4 | 20 | 16 | 7 10 | 18 33 | 16 | 6 55 | 18 37 |
| 12 | 12 | 7 | 17 | C | | 7 | 39 | 4 | 21 | 17 | 8 11 | 18 17 | 17 | 7 56 | 18 21 |
| 1 | 8 | 16 | 18 | D | | 7 | 37 | 4 | 23 | 18 | 9 12 | 18 1 | 18 | 8 57 | 18 5 |
| 9 | 20 | 57 | 19 | E | | 7 | 35 | 4 | 25 | 19 | 10 13 | 17 46 | 19 | 9 58 | 17 49 |
| | | | 20 | F | Fabian | 4 | 26 | | | 20 | 11 14 | 17 28 | 20 | 10 59 | 17 32 |
| 17 | 17 | 6 | 21 | G | Agnes | 4 | 28 | | | 21 | 12 15 | 17 11 | 21 | 12 0 | 17 15 |
| | | | 22 | A | Vincent | | 30 | | | 22 | 13 15 | 16 54 | 22 | 13 1 | 16 58 |
| 6 | 5 | 47 | 23 | B | | 7 | 29 | 4 | 31 | 23 | 14 16 | 16 36 | 23 | 14 2 | 16 41 |
| 14 | 18 | 28 | 24 | C | | 7 | 27 | 4 | 33 | 24 | 15 17 | 16 19 | 24 | 15 2 | 16 23 |
| | | | 25 | D | Conv. of Pau | | | | | 25 | 16 18 | 16 0 | 25 | 16 3 | 16 5 |
| 3 | 14 | 37 | 26 | E | | 7 | 23 | 4 | 37 | 26 | 17 19 | 15 42 | 26 | 17 4 | 15 47 |
| | | | 27 | F | | 7 | 22 | 4 | 38 | 27 | 18 20 | 15 23 | 27 | 18 5 | 15 48 |
| 11 | 3 | 18 | 28 | G | | 7 | 20 | 4 | 40 | 28 | 19 20 | 15 5 | 28 | 19 6 | 15 9 |
| 9 | 23 | 2 | 29 | A | | 7 | 18 | 4 | 42 | 29 | 20 21 | 14 45 | 29 | 20 6 | 14 50 |
| | | | 30 | B | | 7 | 16 | 4 | 44 | 30 | 21 22 | 14 26 | 30 | 21 7 | 14 31 |
| 8 | 12 | 8 | 31 | C | | 7 | 14 | 4 | 46 | 31 | 22 22 | 14 6 | 31 | 22 8 | 14 11 |

South Declination decreasing.

# January.

| 1691 | Third year, ☉ in Capricorn. Suns Longi. D. M. | Suns Decli. D. M. | | Leap year, ☉ in Capricorn. 1692 Suns Long. D. M. | Suns Decli. D. M. |
|---|---|---|---|---|---|
| 1 | 21 23 | 21 49 | | 1 21 8 | 21 51 |
| 2 | 22 24 | 21 39 | | 2 22 9 | 21 42 |
| 3 | 23 25 | 21 29 | | 3 23 11 | 21 32 |
| 4 | 24 27 | 21 18 | | 4 24 12 | 21 21 |
| 5 | 25 28 | 21 7 | | 5 25 13 | 21 10 |
| 6 | 26 29 | 20 56 | | 6 26 14 | 20 59 |
| 7 | 27 30 | 20 44 | | 7 27 15 | 20 47 |
| 8 | 28 31 | 20 32 | | 8 28 17 | 20 35 |
| 9 | 29 33 | 20 19 | | 9 29 18 | 20 22 |
| 10 | ♒ 34 | 20 6 | | 10 ♒ 19 | 20 9 |
| 11 | 1 35 | 19 53 | | 11 1 20 | 19 56 |
| 12 | 2 36 | 19 39 | | 12 2 21 | 19 42 |
| 13 | 3 37 | 19 25 | | 13 3 22 | 19 28 |
| 14 | 4 38 | 19 10 | | 14 4 23 | 19 14 |
| 15 | 5 39 | 18 56 | | 15 5 24 | 18 59 |
| 16 | 6 40 | 18 40 | | 16 6 25 | 18 44 |
| 17 | 7 41 | 18 25 | | 17 7 26 | 18 29 |
| 18 | 8 42 | 18 9 | | 18 8 27 | 18 13 |
| 19 | 9 43 | 17 53 | | 19 9 28 | 17 57 |
| 20 | 10 44 | 17 36 | | 20 10 29 | 17 40 |
| 21 | 11 45 | 17 19 | | 21 11 30 | 17 24 |
| 22 | 12 46 | 17 2 | | 22 12 31 | 17 7 |
| 23 | 13 47 | 16 45 | | 23 13 32 | 16 49 |
| 24 | 14 48 | 16 27 | | 24 14 33 | 16 32 |
| 25 | 15 49 | 16 9 | | 25 15 34 | 16 14 |
| 26 | 16 49 | 15 51 | | 26 16 35 | 15 55 |
| 27 | 17 50 | 15 32 | | 27 17 36 | 15 37 |
| 28 | 18 51 | 15 14 | | 28 18 36 | 15 18 |
| 29 | 19 52 | 14 55 | | 29 19 37 | 14 59 |
| 30 | 20 52 | 14 35 | | 30 20 38 | 14 40 |
| 31 | 21 53 | 14 16 | | 31 21 38 | 14 21 |

South Declination decreasing.

## A Table of the Sunnes equall motions of Longitude and of the Apogæi for the Yeare 1637 Compleat, and for single Yeares, from 1 to 20; in Signes, Degrees and Parts.

| | Longitude, Si. de. parts | | | Apogæi. Si. de. parts | | |
|---|---|---|---|---|---|---|
| 1637 | 9 | 20 | 9895 | 3 | 6 | 3689 |
| 1 | 11 | 29 | 7616 | 00 | 00 | 0172 |
| 2 | 11 | 29 | 5225 | 00 | 00 | 0344 |
| 3 | 11 | 29 | 2838 | 00 | 00 | 0514 |
| 4 | 00 | 00 | 0308 | 00 | 00 | 0686 |
| 5 | 11 | 29 | 7922 | 00 | 00 | 0855 |
| 6 | 11 | 29 | 5533 | 00 | 00 | 1028 |
| 7 | 11 | 29 | 3147 | 00 | 00 | 1200 |
| 8 | 00 | 00 | 0616 | 00 | 00 | 1369 |
| 9 | 11 | 29 | 8227 | 00 | 00 | 1542 |
| 10 | 11 | 29 | 5841 | 00 | 00 | 1711 |
| 11 | 11 | 29 | 3445 | 00 | 00 | 1883 |
| 12 | 00 | 00 | 0925 | 00 | 00 | 2055 |
| 13 | 11 | 29 | 8536 | 00 | 00 | 2225 |
| 14 | 11 | 29 | 6150 | 00 | 00 | 2400 |
| 15 | 11 | 29 | 3764 | 00 | 00 | 2571 |
| 16 | 00 | 00 | 1233 | 00 | 00 | 2739 |
| 17 | 11 | 29 | 8844 | 00 | 00 | 2911 |
| 18 | 11 | 29 | 6458 | 00 | 00 | 3080 |
| 19 | 11 | 29 | 4072 | 00 | 00 | 3252 |
| 20 | 00 | 00 | 1539 | 00 | 00 | 3425 |

# February hath xxviij dayes.

| The Prime. | The time of the New Moon. H | M. | Monday. | Weeke day | The English Kalender. | Suns rising H.M. | Suns setting H.M. | Fifth yeare, ⊙ in Aquarius. 1649 | Suns Longi D.M. | Suns Decl. D.M | South Declination decreasing. | Second yeare, ⊙ in Aquarius. 1650 | Suns Longi D.M. | Suns Decli. D.M |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 16 | 8 | 17 | 1 | G | | 7 | 12 | 4 | 48 | 1 | 23 | 23 | 13 | 46 | | 1 | 23 | 8 | 13 | 51 |
| 5 | 20 | 58 | 2 | E | Purif. M. | | | | | 2 | 24 | 24 | 13 | 26 | | 2 | 24 | 9 | 13 | 31 |
| | | | 3 | F | | 7 | 9 | 4 | 51 | 3 | 25 | 24 | 13 | 5 | | 3 | 25 | 10 | 13 | 10 |
| 13 | 9 | 40 | 4 | G | | 7 | 7 | 4 | 53 | 4 | 26 | 25 | 12 | 45 | | 4 | 26 | 10 | 12 | 50 |
| | | | 5 | A | Agathe. | | | | 55 | 5 | 27 | 25 | 12 | 25 | | 5 | 27 | 1 | 12 | 30 |
| 2 | 5 | 48 | 6 | B | | 7 | 3 | 4 | 57 | 6 | 28 | 26 | 12 | 4 | | 6 | 28 | 11 | 12 | 9 |
| 10 | 18 | 30 | 7 | C | | 7 | 1 | 4 | 59 | 7 | 29 | 26 | 11 | 43 | | 7 | 29 | 12 | 11 | 48 |
| | | | 8 | D | Sun in Pis. | | | | | 8 | ♓ | 27 | 11 | 21 | | 8 | ♓ | 12 | 11 | 26 |
| 18 | 14 | 39 | 9 | E | | 6 | 57 | 5 | 3 | 9 | 1 | 27 | 11 | 0 | | 9 | 1 | 12 | 11 | 5 |
| | | | 10 | F | | 6 | 55 | 5 | 5 | 10 | 2 | 27 | 10 | 38 | | 10 | 2 | 13 | 10 | 43 |
| 7 | 3 | 20 | 11 | G | | 6 | 53 | 5 | 7 | 11 | 3 | 28 | 10 | 16 | | 11 | 3 | 13 | 10 | 22 |
| 15 | 16 | 1 | 12 | A | | 6 | 51 | 5 | 9 | 12 | 4 | 28 | 9 | 54 | | 12 | 4 | 13 | 9 | 51 |
| | | | 13 | B | | 6 | 49 | 5 | 11 | 13 | 5 | 28 | 9 | 32 | | 13 | 5 | 14 | 9 | 38 |
| 4 | 12 | 10 | 14 | C | Valentine | | | | | 14 | 6 | 29 | 9 | 10 | | 14 | 6 | 14 | 9 | 15 |
| | | | 15 | D | | 6 | 46 | 5 | 14 | 15 | 7 | 29 | 8 | 48 | | 15 | 7 | 14 | 8 | 53 |
| 12 | 0 | 50 | 16 | E | | 6 | 44 | 5 | 16 | 16 | 8 | 29 | 8 | 25 | | 16 | 8 | 14 | 8 | 31 |
| 1 | 0 | 0 | 17 | F | | 6 | 42 | 5 | 18 | 17 | 9 | 29 | 8 | 3 | | 17 | 9 | 15 | 8 | 8 |
| 9 | 9 | 41 | 18 | G | | 6 | 40 | 5 | 20 | 18 | 10 | 29 | 7 | 40 | | 18 | 10 | 15 | 7 | 45 |
| | | | 19 | A | | 6 | 38 | 5 | 22 | 19 | 11 | 29 | 7 | 17 | | 19 | 11 | 15 | 7 | 22 |
| 17 | 5 | 50 | 20 | B | | 6 | 36 | 5 | 24 | 20 | 12 | 29 | 6 | 54 | | 20 | 12 | 15 | 6 | 59 |
| 6 | 18 | 31 | 21 | C | | 6 | 34 | 5 | 26 | 21 | 13 | 29 | 6 | 31 | | 21 | 13 | 15 | 6 | 36 |
| | | | 22 | D | | 6 | 32 | 5 | 28 | 22 | 14 | 29 | 6 | 8 | | 22 | 14 | 15 | 6 | 13 |
| 14 | 7 | 12 | 23 | E | | 6 | 30 | 5 | 30 | 2 | 15 | 29 | 5 | 45 | | 23 | 15 | 15 | 5 | 50 |
| | | | 24 | F | Matthias A. | | | | | 24 | 16 | 29 | 5 | 21 | | 24 | 16 | 15 | 5 | 27 |
| 3 | 3 | 21 | 25 | G | | 6 | 26 | 5 | 34 | 25 | 17 | 29 | 4 | 58 | | 25 | 17 | 14 | 5 | 4 |
| 11 | 16 | 2 | 26 | A | | 6 | 24 | 5 | 36 | 26 | 18 | 29 | 4 | 34 | | 26 | 18 | 14 | 4 | 40 |
| | | | 27 | B | | 6 | 22 | 5 | 38 | 27 | 19 | 29 | 4 | 11 | | 27 | 19 | 14 | 4 | 17 |
| 19 | 12 | 11 | 28 | C | | 6 | 20 | 5 | 40 | 28 | 20 | 28 | 3 | 47 | | 28 | 20 | 14 | 3 | 53 |

*When it is Leap-year Febr. hath 29 days, and then is S. Matthias the 25 day*

# February.

| 1 | Third year, ☉ in Aquarius. Suns Longi. D. M. | Suns Decli. D. M. | | Leap year, ☉ in Aquarius. Suns Long. D. M. | Suns Decli. D. M. |
|---|---|---|---|---|---|
| 1 | 22 54 | 13 56 | 1 | 22 39 | 14 1 |
| 2 | 23 54 | 13 36 | 2 | 23 40 | 13 41 |
| 3 | 24 55 | 13 16 | 3 | 24 40 | 13 21 |
| 4 | 25 56 | 12 55 | 4 | 25 41 | 13 00 |
| 5 | 26 56 | 12 35 | 5 | 26 41 | 12 40 |
| 6 | 27 57 | 12 14 | 6 | 27 42 | 12 19 |
| 7 | 28 57 | 11 53 | 7 | 28 42 | 11 58 |
| 8 | 29 57 | 11 32 | 8 | 29 43 | 11 37 |
| 9 | ♓ 58 | 11 10 | 9 | ♓ 43 | 11 16 |
| 10 | 1 58 | 10 49 | 10 | 1 44 | 10 54 |
| 11 | 2 59 | 10 27 | 11 | 2 44 | 10 32 |
| 12 | 3 59 | 10 5 | 12 | 3 44 | 10 10 |
| 13 | 4 59 | 9 43 | 13 | 4 45 | 9 48 |
| 14 | 5 59 | 9 21 | 14 | 5 45 | 9 26 |
| 15 | 7 0 | 8 58 | 15 | 6 45 | 9 4 |
| 16 | 8 0 | 8 36 | 16 | 7 45 | 8 42 |
| 17 | 9 0 | 8 14 | 17 | 8 46 | 8 19 |
| 18 | 10 0 | 7 51 | 18 | 9 46 | 7 56 |
| 19 | 11 0 | 7 28 | 19 | 10 46 | 7 33 |
| 20 | 12 0 | 7 5 | 20 | 11 46 | 7 10 |
| 21 | 13 0 | 6 42 | 21 | 12 46 | 6 47 |
| 22 | 14 0 | 6 19 | 22 | 13 46 | 6 24 |
| 23 | 15 0 | 5 56 | 23 | 14 46 | 6 1 |
| 24 | 16 0 | 5 32 | 24 | 15 46 | 5 38 |
| 25 | 17 0 | 5 9 | 25 | 16 46 | 5 15 |
| 26 | 18 0 | 4 46 | 26 | 17 45 | 5 52 |
| 27 | 19 0 | 4 22 | 27 | 18 45 | 4 29 |
| 28 | 19 59 | 3 59 | 28 | 19 45 | 4 4 |
| | | | 29 | 20 45 | 3 41 |

South Declination decreasing.

# A Table of the Sunnes equall motions of Longitude, and of the Apogæi, for the Moneths compleat of the common Year, in Signes, Degrees, and Parts.

| | Longitude, Si. de. parts | Apogæi. Parts. |
|---|---|---|
| Janu. | 1 00 5550 | 0014 |
| Febru. | 1 28 1530 | 0028 |
| March | 2 28 7083 | 0042 |
| Aprill, | 3 28 2775 | 0055 |
| May, | 4 28 8328 | 0069 |
| June, | 5 28 4022 | 0083 |
| July, | 6 28 9572 | 0100 |
| Augu. | 7 29 5122 | 0114 |
| Septē. | 8 29 0817 | 0128 |
| Octo. | 9 29 6367 | 0142 |
| Novē | 10 29 2061 | 0155 |
| Decē. | 11 29 7616 | 0172 |

# March hath xxxj. dayes.

| The Prime. | The time of the New Moon. H. | M. | Moneth day. | Week day. | The English Kalender. Suns rising. H. | M | Suns seting. H. | M. | First year, ⊙ in Pisces. 1649 Suns Longi D. | M. | Suns Decli. H. | M | South Declination increasing. | Second year, ⊙ in Pisces. 1650 Suns Longi D. | M. | Suns Decli. D. | M. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 8 | 0 | 52 | 1 | D | David | | 5 | 42 | 1 | 21 | 28 | 3 | 24 | 1 | 21 | 14 | 3 29 |
| 16 | 21 | 1 | 2 | E | 6 | 16 | 5 | 44 | 2 | 22 | 28 | 3 | 0 | 2 | 22 | 13 | 3 6 |
| | | | 3 | F | 6 | 16 | 5 | 46 | 3 | 23 | 27 | 2 | 37 | 3 | 23 | 13 | 2 42 |
| 5 | 9 | 43 | 4 | G | 6 | 12 | 5 | 48 | 4 | 24 | 27 | 2 | 13 | 4 | 24 | 13 | 2 18 |
| 13 | 22 | 24 | 5 | A | 6 | 10 | 5 | 50 | 5 | 25 | 26 | 1 | 49 | 5 | 25 | 12 | 1 55 |
| | | | 6 | B | 6 | 8 | 5 | 52 | 6 | 26 | 26 | 1 | 25 | 6 | 26 | 12 | 1 31 |
| 2 | 18 | 33 | 7 | C | 6 | 6 | 5 | 54 | 7 | 27 | 26 | 1 | 1 | 7 | 27 | 11 | 1 7 |
| | | | 8 | D | 6 | 4 | 5 | 56 | 8 | 28 | 25 | 0 | 38 | 8 | 28 | 11 | 0 43 |
| 10 | 7 | 14 | 9 | E | 6 | 2 | 5 | 58 | 9 | 29 | 24 | 0 | 14 | 9 | 29 | 10 | 0 20 |
| | | | 10 | F | Sun in Aries | | | | 10 | ♈ | 24 | 0 | 10 | 10 | ♈ | 9 | 0 4 |
| 18 | 3 | 23 | 11 | G | Gregory | | 2 | | 11 | 1 | 23 | 0 | 33 | 11 | 1 | 9 | 0 28 |
| 7 | 16 | 4 | 12 | A | 5 | 56 | 6 | 4 | 12 | 2 | 22 | 0 | 57 | 12 | 2 | 8 | 0 51 |
| | | | 13 | B | 5 | 54 | 6 | 6 | 13 | 3 | 22 | 1 | 21 | 13 | 3 | 7 | 1 15 |
| 15 | 4 | 45 | 14 | C | 5 | 52 | 6 | 8 | 14 | 4 | 21 | 1 | 44 | 14 | 4 | 7 | 1 39 |
| 4 | 9 | 43 | 15 | D | 5 | 50 | 6 | 10 | 15 | 5 | 20 | 2 | 8 | 15 | 5 | 6 | 2 2 |
| 12 | 13 | 35 | 16 | E | 5 | 48 | 6 | 12 | 16 | 6 | 19 | 2 | 31 | 16 | 6 | 5 | 2 25 |
| | | | 17 | F | 5 | 46 | 6 | 14 | 17 | 7 | 18 | 2 | 54 | 17 | 7 | 4 | 2 49 |
| 1 | 9 | 44 | 18 | G | Edward | | | 16 | 18 | 8 | 18 | 3 | 18 | 18 | 8 | 3 | 3 12 |
| 9 | 22 | 25 | 19 | A | 5 | 42 | 6 | 18 | 19 | 9 | 17 | 3 | 41 | 19 | 9 | 2 | 3 36 |
| | | | 20 | B | Benedict | | | 20 | 20 | 10 | 16 | 4 | 5 | 20 | 10 | 1 | 3 59 |
| 17 | 18 | 34 | 21 | C | 5 | 38 | 6 | 22 | 21 | 11 | 15 | 4 | 28 | 21 | 11 | 0 | 4 22 |
| | | | 22 | D | 5 | 36 | 6 | 24 | 22 | 12 | 14 | 4 | 51 | 22 | 11 | 59 | 4 45 |
| 6 | 7 | 15 | 23 | E | 5 | 34 | 6 | 26 | 23 | 13 | 13 | 5 | 14 | 23 | 12 | 58 | 5 8 |
| 14 | 19 | 56 | 24 | F | 5 | 32 | 6 | 28 | 24 | 14 | 11 | 5 | 37 | 24 | 13 | 57 | 5 31 |
| | | | 25 | G | An. of Mary | | | | 25 | 15 | 10 | 6 | 0 | 25 | 14 | 56 | 5 54 |
| 3 | 16 | 5 | 26 | A | 5 | 28 | 6 | 32 | 26 | 16 | 9 | 6 | 22 | 26 | 15 | 55 | 6 17 |
| | | | 27 | B | 5 | 26 | 6 | 34 | 27 | 17 | 8 | 6 | 45 | 27 | 16 | 54 | 6 40 |
| 11 | 4 | 46 | 28 | C | 5 | 24 | 6 | 36 | 28 | 18 | 6 | 7 | 7 | 28 | 17 | 52 | 7 2 |
| 19 | 0 | 55 | 29 | D | 5 | 22 | 6 | 38 | 29 | 19 | 5 | 7 | 30 | 29 | 18 | 51 | 7 25 |
| 8 | 13 | 37 | 30 | E | 5 | 20 | 6 | 40 | 30 | 20 | 4 | 7 | 52 | 30 | 19 | 50 | 7 47 |
| | | | 31 | F | 5 | 18 | 6 | 42 | 31 | 21 | 3 | 8 | 15 | 31 | 20 | 48 | 8 9 |

# March.

| | Third year, ☉ in Pisces. | | | Leap year ☉ in Pisces. | | | |
|---|---|---|---|---|---|---|---|
| | 1651 | Suns Longi | Suns Decli | 1652 | Suns Longi | Suns Decli | |
| | D. | D. M. | D. M. | D. | D. M. | D. M. | |
| 1 | 20 | 59 | 3 35 | 1 | 21 44 | 3 17 | |
| 2 | 21 | 59 | 3 11 | 2 | 22 44 | 2 54 | |
| 3 | 22 | 59 | 2 48 | 3 | 23 44 | 2 30 | |
| 4 | 23 | 58 | 2 24 | 4 | 24 43 | 2 6 | |
| 5 | 24 | 58 | 2 0 | 5 | 25 42 | 1 43 | |
| 6 | 25 | 57 | 1 37 | 6 | 26 42 | 1 19 | |
| 7 | 26 | 57 | 1 13 | 7 | 27 42 | 0 55 | |
| 8 | 27 | 56 | 0 49 | 8 | 28 41 | 0 32 | |
| 9 | 28 | 56 | 0 26 | 9 | 29 41 | 0 8 | |
| 10 | 29 | 55 | 0 2 | 10 | ♈ 40 | 0 16 | |
| 11 | ♈ | 55 | 0 22 | 11 | 1 40 | 0 40 | |
| 12 | 1 | 54 | 0 46 | 12 | 2 39 | 1 3 | |
| 13 | 2 | 53 | 1 9 | 13 | 3 38 | 1 27 | |
| 14 | 3 | 52 | 1 33 | 14 | 4 37 | 1 50 | |
| 15 | 4 | 52 | 1 56 | 15 | 5 37 | 2 14 | |
| 16 | 5 | 51 | 2 20 | 16 | 6 36 | 2 38 | |
| 17 | 6 | 50 | 2 43 | 17 | 7 35 | 3 2 | |
| 18 | 7 | 49 | 3 7 | 18 | 8 34 | 3 25 | |
| 19 | 8 | 48 | 3 30 | 19 | 9 33 | 3 48 | |
| 20 | 9 | 47 | 3 53 | 20 | 10 32 | 4 11 | |
| 21 | 10 | 46 | 4 17 | 21 | 11 31 | 4 34 | |
| 22 | 11 | 45 | 4 40 | 22 | 12 30 | 4 57 | |
| 23 | 12 | 44 | 5 3 | 23 | 13 29 | 5 20 | |
| 24 | 13 | 43 | 5 26 | 24 | 14 28 | 5 43 | |
| 25 | 14 | 42 | 5 49 | 25 | 15 26 | 6 6 | |
| 26 | 15 | 41 | 6 12 | 26 | 16 25 | 6 29 | |
| 27 | 16 | 39 | 6 34 | 27 | 17 24 | 6 51 | |
| 28 | 17 | 38 | 6 57 | 28 | 18 23 | 7 14 | |
| 29 | 18 | 37 | 7 19 | 29 | 19 21 | 7 36 | |
| 30 | 19 | 36 | 7 42 | 30 | 20 20 | 7 58 | |
| 31 | 20 | 24 | 8 4 | 31 | 21 19 | 8 21 | |

South Declination decreasing. | North Declination increasing.

## A Table of the Suns equall motion of Longitude, for Dayes and Hours in Degrees and Parts.

| | Dayes Deg. parts. | | Houres Deg. parts. | |
|---|---|---|---|---|
| 1 | 0 | 9855 | 0 | 0411 |
| 2 | 1 | 9714 | 0 | 0822 |
| 3 | 2 | 9569 | 0 | 1233 |
| 4 | 3 | 9425 | 0 | 1642 |
| 5 | 4 | 9283 | 0 | 2025 |
| 6 | 5 | 9139 | 0 | 2464 |
| 7 | 6 | 8994 | 0 | 2875 |
| 8 | 7 | 8853 | 0 | 3286 |
| 9 | 8 | 8708 | 0 | 3697 |
| 10 | 9 | 8364 | 0 | 4105 |
| 11 | 10 | 8422 | 0 | 4517 |
| 12 | 11 | 8278 | 0 | 4928 |
| 13 | 12 | 8133 | 0 | 5339 |
| 14 | 13 | 7992 | 0 | 5750 |
| 15 | 14 | 7847 | 0 | 6189 |
| 16 | 15 | 7703 | 0 | 6572 |
| 17 | 16 | 7561 | 0 | 6980 |
| 18 | 17 | 7417 | 0 | 7392 |
| 29 | 18 | 7272 | 0 | 8214 |
| 20 | 19 | 7130 | 0 | 8625 |
| 21 | 20 | 6986 | 0 | 9036 |
| 22 | 21 | 6842 | 0 | 9444 |
| 23 | 22 | 6700 | 0 | 9855 |
| 24 | 23 | 6555 | 1 | 0066 |
| 25 | 24 | 6411 | 1 | 0678 |
| 26 | 25 | 6260 | 1 | 1086 |
| 27 | 26 | 6153 | 1 | 1500 |
| 28 | 27 | 5980 | 1 | 1911 |
| 29 | 28 | 5833 | 1 | 2319 |
| 30 | 29 | 5694 | 1 | 2319 |
| 31 | 30 | 5550 | 1 | 2730 |

# Aprill hath xxx. dayes.

| The Prime. | The time of the New Moon. H. | M. | Moneth day. | Weekday. | The English Kalender. Suns rising. H. | M | Suns setting. H. | M. | First year, ⊙ in Aries. 1649 Suns Longi D. | M. | Suns Decl. H. | M | North Declination increasing. | Second year, in Aries. 1650 Suns Longi D. | M. | Suns Decli. D. | M. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 16 | 9 | 45 | 1 | G | 5 | 16 | 6 | 44 | 1 | 22 | 1 | 8 | 36 | 1 | 21 | 47 | 8 | 31 |
| 5 | 22 | 27 | 2 | A | 5 | 14 | 6 | 46 | 2 | 23 | 0 | 8 | 58 | 2 | 22 | 46 | 8 | 53 |
| | | | 3 | B | 5 | 12 | 6 | 48 | 3 | 23 | 58 | 9 | 20 | 3 | 23 | 44 | 9 | 15 |
| 13 | 11 | 8 | 4 | C | Ambrose. | | | | 4 | 24 | 51 | 9 | 42 | 4 | 24 | 43 | 9 | 36 |
| | | | 5 | D | 5 | 8 | 6 | 52 | 5 | 25 | 55 | 10 | 3 | 5 | 25 | 41 | 9 | 58 |
| 2 | 7 | 17 | 6 | E | 5 | 6 | 6 | 54 | 6 | 26 | 54 | 10 | 24 | 6 | 26 | 40 | 10 | 19 |
| 10 | 19 | 58 | 7 | F | 5 | 4 | 6 | 56 | 7 | 27 | 52 | 10 | 45 | 7 | 27 | 38 | 10 | 40 |
| | | | 8 | G | 5 | 3 | 6 | 57 | 8 | 28 | 50 | 11 | 6 | 8 | 28 | 36 | 11 | 1 |
| 18 | 16 | 7 | 9 | A | 5 | 1 | 6 | 59 | 9 | 29 | 49 | 11 | 27 | 9 | 29 | 35 | 11 | 22 |
| | | | 10 | B | Sun in Taur. | | | | 10 | ♉ | 47 | 11 | 47 | 10 | ♉ | 33 | 11 | 42 |
| 7 | 4 | 48 | 11 | C | 4 | 58 | 7 | 2 | 11 | 1 | 45 | 12 | 7 | 11 | 1 | 31 | 12 | 3 |
| 15 | 17 | 29 | 12 | D | 4 | 56 | 7 | 4 | 12 | 2 | 44 | 12 | 28 | 12 | 2 | 30 | 12 | 23 |
| 4 | 13 | 38 | 13 | E | 4 | 54 | 7 | 6 | 13 | 3 | 42 | 12 | 48 | 13 | 3 | 28 | 12 | 43 |
| | | | 14 | F | 4 | 52 | 7 | 8 | 14 | 4 | 40 | 13 | 6 | 14 | 4 | 26 | 13 | 3 |
| 12 | 2 | 19 | 15 | G | 4 | 50 | 7 | 10 | 15 | 5 | 38 | 13 | 27 | 15 | 5 | 24 | 13 | 22 |
| 1 | 22 | 28 | 16 | A | 4 | 49 | 7 | 11 | 16 | 6 | 36 | 13 | 46 | 16 | 6 | 22 | 13 | 41 |
| | | | 17 | B | 4 | 47 | 7 | 13 | 17 | 7 | 34 | 14 | 5 | 17 | 7 | 20 | 14 | 0 |
| 9 | 11 | 9 | 18 | C | 4 | 45 | 7 | 15 | 18 | 8 | 32 | 14 | 24 | 18 | 8 | 18 | 14 | 19 |
| | | | 19 | D | 4 | 43 | 7 | 17 | 19 | 9 | 30 | 14 | 42 | 19 | 9 | 16 | 14 | 38 |
| 17 | 7 | 18 | 20 | E | 4 | 41 | 7 | 19 | 20 | 10 | 28 | 15 | 1 | 20 | 10 | 14 | 14 | 56 |
| 6 | 19 | 59 | 21 | F | 4 | 40 | 7 | 20 | 21 | 11 | 26 | 15 | 19 | 21 | 11 | 12 | 15 | 15 |
| | | | 22 | G | 4 | 38 | 7 | 22 | 22 | 12 | 24 | 15 | 37 | 22 | 12 | 10 | 15 | 33 |
| 14 | 8 | 40 | 23 | A | George. | | | | 23 | 13 | 22 | 15 | 54 | 23 | 13 | 8 | 15 | 50 |
| | | | 24 | B | 4 | 35 | 7 | 25 | 24 | 14 | 20 | 16 | 12 | 24 | 14 | 6 | 16 | 8 |
| 3 | 4 | 49 | 25 | C | Mark Evã. | | | | 25 | 15 | 18 | 16 | 29 | 25 | 15 | 4 | 16 | 25 |
| 11 | 17 | 31 | 26 | D | 4 | 31 | 7 | 29 | 26 | 16 | 16 | 16 | 46 | 26 | 16 | 2 | 16 | 42 |
| 19 | 13 | 39 | 27 | E | 4 | 29 | 7 | 31 | 27 | 17 | 14 | 17 | 2 | 27 | 17 | 0 | 16 | 58 |
| | | | 28 | F | 4 | 28 | 7 | 32 | 28 | 18 | 11 | 17 | 18 | 28 | 17 | 57 | 17 | 14 |
| 8 | 2 | 21 | 29 | G | 4 | 26 | 7 | 34 | 29 | 19 | 9 | 17 | 34 | 29 | 18 | 55 | 17 | 31 |
| 16 | 22 | 29 | 30 | A | 4 | 25 | 7 | 35 | 30 | 20 | 7 | 17 | 50 | 30 | 19 | 54 | 17 | 46 |

## Aprill.

| 1651 | Third year, ⊙ in Aries. Suns Longi. D. M. | Suns Decli. D. M. | | 1652 | Leap-year, ⊙ in Aries. Suns Long. D. M. | Suns Decli. D. M. |
|---|---|---|---|---|---|---|
| 1 | 21 33 | 8 26 | | 1 | 22 17 | 8 42 |
| 2 | 22 31 | 8 48 | | 2 | 23 16 | 9 4 |
| 3 | 23 30 | 9 9 | | 3 | 24 14 | 9 26 |
| 4 | 24 29 | 9 31 | | 4 | 25 13 | 9 47 |
| 5 | 25 27 | 9 53 | | 5 | 26 11 | 10 9 |
| 6 | 26 25 | 10 14 | | 6 | 27 10 | 10 30 |
| 7 | 27 24 | 10 35 | | 7 | 28 8 | 10 51 |
| 8 | 28 22 | 10 56 | | 8 | 29 7 | 11 12 |
| 9 | 29 21 | 11 17 | | 9 | ♉ 5 | 11 32 |
| 10 | ♉ 19 | 11 37 | | 10 | 1 3 | 11 53 |
| 11 | 1 17 | 11 58 | | 11 | 2 1 | 12 13 |
| 12 | 2 15 | 12 18 | | 12 | 3 0 | 12 33 |
| 13 | 3 14 | 12 38 | | 13 | 3 58 | 12 53 |
| 14 | 4 12 | 12 58 | | 14 | 4 56 | 13 12 |
| 15 | 5 10 | 13 17 | | 15 | 5 54 | 13 32 |
| 16 | 6 8 | 13 37 | | 16 | 6 52 | 13 51 |
| 17 | 7 6 | 13 56 | | 17 | 7 50 | 14 10 |
| 18 | 8 4 | 14 15 | | 18 | 8 48 | 14 29 |
| 19 | 9 2 | 14 34 | | 19 | 9 46 | 14 48 |
| 20 | 10 0 | 14 52 | | 20 | 10 44 | 15 6 |
| 21 | 10 58 | 15 10 | | 21 | 11 42 | 15 24 |
| 22 | 11 56 | 15 28 | | 22 | 12 40 | 15 42 |
| 23 | 12 54 | 15 46 | | 23 | 13 38 | 15 59 |
| 24 | 13 52 | 16 : | | 24 | 14 36 | 16 17 |
| 25 | 14 50 | 16 21 | | 25 | 15 34 | 16 34 |
| 26 | 15 48 | 16 38 | | 26 | 16 32 | 16 50 |
| 27 | 16 46 | 16 54 | | 27 | 17 30 | 17 7 |
| 28 | 17 44 | 17 11 | | 28 | 18 27 | 17 23 |
| 29 | 18 41 | 17 27 | | 29 | 19 25 | 17 39 |
| 30 | 19 39 | 17 43 | | 30 | 20 23 | 17 54 |

North declination increaſing.

### To find the Sunnes place by theſe Tables of the equall motions.

Firſt, we are to conſider, that the Aſtronomers begin their Day at Noone, as if I would ſeeke the Sunnes place the 17 of June, 1638. at 9 of the clock in the morning, I muſt ſeeke for it the 15 day, 21 houres after noone. But if I would ſeek it the 17 day at 7 of the clock at night, I muſt ſeeke it for the 16 day, and 7 houres afternoon, and the like of all other.

Againe, there is to be conſidered, when you would ſeeke the Sunnes place, whether you are to the Eaſtwards, or to the Weſtwards of London, for every 15 degrees to the Eaſtwards, you muſt ſubtract one hour of time, and for every 15 degrees to the Weſtwards you muſt adde one hour of time.

Further, at any time of the Leape-yeare after February, you muſt make the time one day more than it is, becauſe the Table of the Moneths, is but for the com-

# May hath xxxj. dayes.

| The Prime. | The time of the New Moon. H. | M. | Monthday. | Weekday. | The English Kalender. Sunne rising. H. | M. | Sunne setting. H. | M. | First year, ⊙ in Taurus. 1649 Sunne Longi. D. | M. | Sunne Decli. H | M | Second year, ⊙ in Taurus. 1650 Sunne Long. D. | M. | Sunne Decli. D. | M. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 1 | B | Philip Jac. | | | | 1 | 21 | 5 | 18 | 6 | 1 | 20 | 51 | 18 | 2 |
| 5 | 11 | 11 | 2 | C | 4 | 21 | 7 | 39 | 2 | 22 | 2 | 18 | 20 | 2 | 21 | 48 | 18 | 17 |
| 13 | 23 | 52 | 3 | D | Inven. of cro. | | | | 3 | 23 | 0 | 18 | 35 | 3 | 22 | 46 | 18 | 32 |
| | | | 4 | E | 4 | 18 | 7 | 42 | 4 | 23 | 58 | 18 | 50 | 4 | 23 | 44 | 18 | 46 |
| 2 | 20 | 1 | 5 | F | 4 | 16 | 7 | 44 | 5 | 24 | 55 | 19 | 4 | 5 | 24 | 41 | 19 | 0 |
| | | | 6 | G | John Portlat | | | | 6 | 25 | 53 | 19 | 18 | 6 | 25 | 39 | 19 | 14 |
| 10 | 8 | 4 | 7 | A | 4 | 14 | 7 | 46 | 7 | 26 | 50 | 19 | 31 | 7 | 26 | 36 | 19 | 28 |
| | | | 8 | B | 4 | 13 | 7 | 47 | 8 | 27 | 48 | 19 | 44 | 8 | 27 | 34 | 19 | 41 |
| 18 | 4 | 51 | 9 | C | 4 | 11 | 7 | 49 | 9 | 28 | 45 | 19 | 57 | 9 | 28 | 31 | 19 | 54 |
| 7 | 17 | 32 | 10 | D | 4 | 10 | 7 | 50 | 10 | 29 | 43 | 20 | 10 | 10 | 29 | 29 | 20 | 7 |
| | | | 11 | E | Sun in *Gemin* | | | | 11 | II | 40 | 20 | 22 | 11 | II | 26 | 20 | 19 |
| 15 | 6 | 13 | 12 | F | 4 | 7 | 7 | 53 | 12 | 1 | 38 | 20 | 34 | 12 | 1 | 24 | 20 | 31 |
| 4 | 2 | 22 | 13 | G | 4 | 6 | 7 | 54 | 13 | 2 | 35 | 20 | 45 | 13 | 2 | 21 | 20 | 42 |
| 12 | 15 | 3 | 14 | A | 4 | 5 | 7 | 55 | 14 | 3 | 33 | 20 | 56 | 14 | 3 | 19 | 20 | 54 |
| | | | 15 | B | 4 | 4 | 7 | 56 | 15 | 4 | 30 | 21 | 7 | 15 | 4 | 16 | 21 | 4 |
| 1 | 11 | 12 | 16 | C | 4 | 3 | 7 | 57 | 16 | 5 | 28 | 21 | 17 | 16 | 5 | 14 | 21 | 15 |
| 9 | 23 | 53 | 17 | D | 4 | 2 | 7 | 58 | 17 | 6 | 25 | 21 | 27 | 17 | 6 | 11 | 21 | 25 |
| | | | 18 | E | 4 | 1 | 7 | 59 | 18 | 7 | 22 | 21 | 37 | 18 | 7 | 8 | 21 | 35 |
| 17 | 20 | 2 | 19 | F | Dunstan. | | | | 19 | 8 | 20 | 21 | 46 | 19 | 8 | 6 | 21 | 44 |
| | | | 20 | G | 4 | 59 | 8 | 1 | 20 | 9 | 17 | 21 | 55 | 20 | 9 | 3 | 21 | 53 |
| 6 | 8 | 43 | 21 | A | 3 | 57 | 8 | 3 | 21 | 10 | 14 | 22 | 4 | 21 | 10 | 0 | 22 | 2 |
| 14 | 21 | 25 | 22 | B | 3 | 56 | 8 | 4 | 22 | 11 | 12 | 22 | 12 | 22 | 10 | 58 | 22 | 10 |
| | | | 23 | C | 3 | 55 | 8 | 5 | 23 | 12 | 9 | 22 | 20 | 23 | 11 | 55 | 22 | 18 |
| 3 | 17 | 33 | 24 | D | 3 | 55 | 8 | 5 | 24 | 13 | 6 | 22 | 27 | 24 | 12 | 52 | 22 | 25 |
| | | | 25 | E | 3 | 54 | 8 | 6 | 25 | 14 | 3 | 22 | 34 | 25 | 13 | 50 | 22 | 33 |
| 11 | 6 | 15 | 26 | F | Augustin. | | | | 8 | 7 | 26 | 15 | 1 | 22 | 41 | 26 | 14 | 47 |
| 19 | 2 | 23 | 27 | G | 3 | 52 | 8 | 8 | 27 | 15 | 58 | 22 | 47 | 27 | 15 | 44 | 22 | 45 |
| 8 | 15 | 5 | 28 | A | 3 | 52 | 8 | 8 | 28 | 16 | 55 | 22 | 53 | 28 | 16 | 41 | 22 | 51 |
| | | | 29 | B | 3 | 51 | 8 | 9 | 29 | 17 | 52 | 22 | 58 | 29 | 17 | 38 | 22 | 57 |
| 16 | 11 | 13 | 30 | C | 3 | 50 | 8 | 10 | 30 | 18 | 49 | 23 | 2 | 30 | 18 | 36 | 23 | 2 |
| | | | 31 | D | 3 | 50 | 8 | 10 | 31 | 19 | 46 | 23 | 8 | 31 | 19 | 33 | 23 | 7 |

North Declination. Increasing.

| 1637 | Third year, ☉ in Taurus. Suns Longi. | | Suns Decli. | | 1652 | Leap year, ☉ in Taurus. Suns Long. | | Suns Decli. | |
|---|---|---|---|---|---|---|---|---|---|
| | D. | M. | D. | M. | | D. | M. | D. | M. |
| 1 | 20 | 37 | 17 | 58 | 1 | 21 | 20 | 18 | 10 |
| 2 | 21 | 34 | 18 | 13 | 2 | 22 | 18 | 18 | 25 |
| 3 | 22 | 32 | 18 | 28 | 3 | 23 | 16 | 18 | 39 |
| 4 | 23 | 30 | 18 | 43 | 4 | 24 | 13 | 18 | 54 |
| 5 | 24 | 27 | 18 | 57 | 5 | 25 | 11 | 19 | 8 |
| 6 | 25 | 25 | 19 | 11 | 6 | 26 | 9 | 19 | 22 |
| 7 | 26 | 23 | 19 | 25 | 7 | 27 | 6 | 19 | 31 |
| 8 | 27 | 20 | 19 | 38 | 8 | 28 | 4 | 19 | 48 |
| 9 | 28 | 18 | 19 | 51 | 9 | 29 | 1 | 20 | 1 |
| 10 | 29 | 15 | 20 | 4 | 10 | 29 | 59 | 20 | 13 |
| 11 | ♊ | 13 | 20 | 16 | 11 | ♊ | 56 | 20 | 25 |
| 12 | 1 | 10 | 20 | 28 | 12 | 1 | 54 | 20 | 37 |
| 13 | 2 | 8 | 20 | 40 | 13 | 2 | 51 | 20 | 48 |
| 14 | 3 | 5 | 20 | 51 | 14 | 3 | 49 | 20 | 59 |
| 15 | 4 | 3 | 21 | 2 | 15 | 4 | 46 | 21 | 10 |
| 16 | 5 | 0 | 21 | 12 | 16 | 5 | 43 | 21 | 20 |
| 17 | 5 | 57 | 21 | 23 | 17 | 6 | 41 | 21 | 30 |
| 18 | 6 | 55 | 21 | 32 | 18 | 7 | 38 | 21 | 40 |
| 19 | 7 | 52 | 21 | 42 | 19 | 8 | 36 | 21 | 49 |
| 20 | 8 | 49 | 21 | 51 | 20 | 9 | 33 | 21 | 58 |
| 21 | 9 | 47 | 22 | 0 | 21 | 10 | 30 | 22 | 6 |
| 22 | 10 | 44 | 22 | 8 | 22 | 11 | 2 | 22 | 14 |
| 23 | 11 | 41 | 22 | 16 | 23 | 12 | 25 | 22 | 22 |
| 24 | 12 | 39 | 22 | 24 | 24 | 13 | 22 | 22 | 29 |
| 25 | 13 | 36 | 22 | 31 | 25 | 14 | 19 | 22 | 36 |
| 26 | 14 | 33 | 22 | 38 | 26 | 15 | 17 | 22 | 43 |
| 27 | 15 | 30 | 22 | 44 | 27 | 16 | 14 | 22 | 49 |
| 28 | 16 | 28 | 22 | 50 | 28 | 17 | 11 | 22 | 54 |
| 29 | 17 | 25 | 22 | 56 | 29 | 18 | 8 | 23 | 0 |
| 30 | 18 | 22 | 23 | 1 | 30 | 19 | 5 | 23 | 4 |
| 31 | 19 | 19 | 23 | 6 | 31 | 20 | 2 | 23 | 9 |

North Declination increasing.

mon yeare, and in the Leap-yeare, February hath 29 dayes.

To find the Sunes places.

The 10 of October, 1638, at noone, that is the 9. day compleat, I desire to know the Sunnes true place the Epocha or rut of these Tables, is for the yeare 1637. compleat, which I first set down, the meane Longitude is 9 Signes, 20 degr. and 9895 parts, which I set by it selfe, and the Apoxi is 3 signes, 6 degrees, and 3689 parts, which I set also by it self, and loke in the Table of moneths, where for September compleat, is 8 Signes, 29 degrees, and 0817 parts, for the meane Longitude which I set under the former, and against 9 dayes compleat is 8 degr. 8708 parts, these three I adde together and the summe is (substracting 12 Signes) 6 Signes, 28 degrees, and 9420 parts, which I keepe and loke in the Table of Moneths for the Apoxi to September compleate, which is 28 parts, which added to the former, is 3.

# June hath xxx dayes.

| The Prime. | The Change of the New Moon. H. | M. | Moon 1 day. | Week day | The English Kalender. | Suns rising H. | M. | Suns setting H. | M. | Fifth yeare, ⊙ in Gemini. 1649 | Suns Longi. D. | M. | Suns Decli. D. | M. | South Declination increasing. North Declination decreasing. | Second year ⊙ in Gemini. 1650 | Suns Longi. D. | M. | Suns Decli. D. | M. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 5 | 0 | 0 | 1 | E | | 3 | 49 | 8 | 11 | 1 | 20 | 44 | 23 | 12 | | 1 | 20 | 30 | 23 | 11 |
| 13 | 12 | 36 | 2 | F | | 3 | 49 | 8 | 11 | 2 | 21 | 41 | 23 | 16 | | 2 | 21 | 27 | 23 | 15 |
| | | | 3 | G | | 3 | 49 | 8 | 11 | 3 | 22 | 38 | 23 | 19 | | 3 | 22 | 24 | 23 | 18 |
| 2 | 8 | 45 | 4 | A | | 3 | 48 | 8 | 12 | 4 | 23 | 35 | 23 | 22 | | 4 | 23 | 22 | 23 | 21 |
| 10 | 21 | 26 | 5 | B | Bonifacc. | | | | 12 | 5 | 24 | 32 | 23 | 25 | | 5 | 24 | 19 | 23 | 24 |
| | | | 6 | C | | 3 | 48 | 8 | 12 | 6 | 25 | 30 | 23 | 27 | | 6 | 25 | 16 | 23 | 26 |
| 18 | 17 | 35 | 7 | D | | 3 | 47 | 8 | 13 | 7 | 26 | 27 | 23 | 29 | | 7 | 26 | 13 | 23 | 28 |
| | | | 8 | E | | 3 | 47 | 8 | 13 | 8 | 27 | 24 | 23 | 30 | | 8 | 27 | 10 | 23 | 30 |
| 7 | 6 | 16 | 9 | F | | 3 | 47 | 8 | 13 | 9 | 28 | 21 | 23 | 31 | | 9 | 28 | 7 | 23 | 31 |
| 15 | 18 | 57 | 10 | G | | 3 | 47 | 8 | 13 | 10 | 29 | 18 | 23 | 31 | | 10 | 29 | 4 | 23 | 31 |
| 4 | 15 | 6 | 11 | A | The long. da. | | | | | 11 | S | 15 | 23 | 32 | | 11 | S | 2 | 23 | 32 |
| | | | 12 | B | Sun in Canc. | | | | | 12 | 1 | 12 | 23 | 31 | | 12 | 0 | 59 | 23 | 31 |
| 12 | 3 | 47 | 13 | C | | 3 | 47 | 8 | 13 | 13 | 2 | 9 | 23 | 30 | | 13 | 1 | 56 | 23 | 31 |
| | | | 14 | D | | 3 | 47 | 8 | 13 | 14 | 3 | 7 | 23 | 29 | | 14 | 2 | 53 | 23 | 30 |
| 1 | 0 | 0 | 15 | E | | 3 | 47 | 8 | 13 | 15 | 4 | 4 | 23 | 28 | | 15 | 3 | 50 | 23 | 28 |
| 9 | 12 | 37 | 16 | F | | 3 | 48 | 8 | 12 | 16 | 5 | 1 | 23 | 26 | | 16 | 4 | 47 | 23 | 26 |
| | | | 17 | G | | 3 | 48 | 8 | 12 | 17 | 5 | 58 | 23 | 23 | | 17 | 5 | 44 | 23 | 24 |
| 17 | 8 | 46 | 18 | A | | 3 | 48 | 8 | 12 | 18 | 6 | 55 | 23 | 21 | | 18 | 6 | 41 | 23 | 21 |
| 6 | 21 | 27 | 19 | B | | 3 | 49 | 8 | 11 | 19 | 7 | 52 | 23 | 17 | | 19 | 7 | 38 | 23 | 18 |
| | | | 20 | C | Edward. | | | | 11 | 20 | 8 | 49 | 23 | 14 | | 20 | 8 | 35 | 23 | 15 |
| 14 | 10 | 9 | 21 | D | | 3 | 49 | 8 | 11 | 21 | 9 | 46 | 23 | 10 | | 21 | 9 | 33 | 23 | 11 |
| | | | 22 | E | | 3 | 50 | 8 | 10 | 22 | 10 | 43 | 23 | 5 | | 22 | 10 | 30 | 23 | 6 |
| 3 | 6 | 17 | 23 | F | | 3 | 50 | 8 | 10 | 23 | 11 | 40 | 23 | 1 | | 23 | 11 | 27 | 23 | 2 |
| 11 | 19 | 0 | 24 | G | John Bapt. | | | | | 24 | 12 | 38 | 22 | 55 | | 24 | 12 | 24 | 22 | 57 |
| 19 | 15 | 7 | 25 | A | | 3 | 52 | 8 | 8 | 25 | 13 | 35 | 22 | 50 | | 25 | 13 | 21 | 22 | 51 |
| | | | 26 | B | | 3 | 52 | 8 | 8 | 26 | 14 | 32 | 22 | 44 | | 26 | 14 | 18 | 22 | 45 |
| 8 | 3 | 49 | 27 | C | | 3 | 53 | 8 | 7 | 27 | 15 | 29 | 22 | 37 | | 27 | 15 | 15 | 22 | 39 |
| | | | 28 | D | | 3 | 54 | 8 | 6 | 28 | 16 | 26 | 22 | 31 | | 28 | 16 | 12 | 22 | 32 |
| 16 | 0 | 0 | 29 | E | Peter Apo. | | | | | 29 | 17 | 23 | 22 | 23 | | 29 | 17 | 9 | 22 | 25 |
| 5 | 12 | 39 | 30 | F | | 3 | 56 | 8 | 4 | 30 | 18 | 20 | 22 | 16 | | 30 | 18 | 7 | 22 | 18 |

# June.

| | Third year, ☉ in Gemini. | | | | Leape year ☉ in Gemini. | | | |
|---|---|---|---|---|---|---|---|---|
| | Suns Longit. | | Suns Declin. | | Suns Longit. | | Suns Declin. | |
| | D. | M. | D. | M. | D. | M. | D. | M. |
| 1 | 20 | 16 | 23 | 10 | 21 | 6 | 23 | 13 |
| 2 | 21 | 14 | 23 | 14 | 21 | 57 | 23 | 17 |
| 3 | 22 | 11 | 23 | 18 | 22 | 54 | 23 | 20 |
| 4 | 23 | 8 | 23 | 21 | 23 | 51 | 23 | 23 |
| 5 | 24 | 5 | 23 | 24 | 24 | 48 | 23 | 25 |
| 6 | 25 | 2 | 23 | 26 | 25 | 45 | 23 | 27 |
| 7 | 25 | 59 | 23 | 28 | 26 | 43 | 23 | 29 |
| 8 | 26 | 56 | 23 | 29 | 27 | 40 | 23 | 30 |
| 9 | 27 | 54 | 23 | 30 | 28 | 37 | 23 | 31 |
| 10 | 28 | 51 | 23 | 31 | 29 | 34 | 23 | 32 |
| 11 | 29 | 48 | 23 | 32 | ☊ | 31 | 23 | 32 |
| 12 | ♋ | 45 | 23 | 32 | 1 | 28 | 23 | 32 |
| 13 | 1 | 42 | 23 | 32 | 2 | 25 | 23 | 32 |
| 14 | 2 | 39 | 23 | 30 | 3 | 22 | 23 | 29 |
| 15 | 3 | 36 | 23 | 29 | 4 | 20 | 23 | 27 |
| 16 | 4 | 33 | 23 | 27 | 5 | 17 | 23 | 25 |
| 17 | 5 | 30 | 23 | 25 | 6 | 14 | 23 | 23 |
| 18 | 6 | 28 | 23 | 22 | 7 | 11 | 23 | 20 |
| 19 | 7 | 25 | 23 | 19 | 8 | 8 | 23 | 16 |
| 20 | 8 | 22 | 23 | 16 | 9 | 5 | 23 | 13 |
| 21 | 9 | 19 | 23 | 12 | 10 | 2 | 23 | 9 |
| 22 | 10 | 16 | 23 | 8 | 10 | 59 | 23 | 4 |
| 23 | 11 | 13 | 23 | 3 | 11 | 56 | 22 | 59 |
| 24 | 12 | 10 | 22 | 58 | 12 | 53 | 22 | 54 |
| 25 | 13 | 7 | 22 | 53 | 13 | 51 | 22 | 48 |
| 26 | 14 | 4 | 22 | 47 | 14 | 48 | 22 | 42 |
| 27 | 15 | 1 | 22 | 41 | 15 | 45 | 22 | 36 |
| 28 | 15 | 59 | 22 | 34 | 16 | 42 | 22 | 29 |
| 29 | 16 | 56 | 22 | 27 | 17 | 39 | 22 | 21 |
| 30 | 17 | 53 | 22 | 20 | 18 | 36 | 22 | 14 |

South Declination increasing.

North Declination decreasing.

[illegible] Minutes, [illegible] I [illegible] from the Suns Longitude, and the Remainer is 3 Signes, 22 degrees, and 5603 parts, of which I take halfe, and it is 56 degrees, 2801 parts, to bring these parts into minutes, multiply them by 6, and cut off 3 figures to the right hand, and the rest shall be minutes, so it shall be 56 degr. 17 min. which I seeke the Tangent of in Peticus, or any other that hath natural Tangents, which Tangent is 149849, which I multiply all degrees by 96464, when the Suns Longitude (after the Apogæi is subtracted) is between two signes and four signes, or between 8 signes, and 10 signes, and the product is (cutting of 5 places to the right hand) a Tangent which I seeke in the Tangents, and finde it neerest at 55 degr. 19 min. which double, and the summe is 110 degrees, 38 min. which I adde to 96 degrees, 22 min. the Apogæi, and the whole is 207 degrees, 00 minutes, which divided by 30, will be 6 signes, and 27 degr. 00 min. that is 27 degrees 00 min. in Libra, the Suns true place the 10 of October 1638 at Rome.

# July hath xxxj dayes.

| The time of the New Moon. | | Month day. | Weeke day | The English Kalender. | | First yeare, ☉ in Cancer. | | | | Second year ☉ in Cancer. | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| The Prime. | | | | Suns rising | Suns letting | 1649 | Suns Longi | Suns Decli. | | 1650 | Suns Longi | Suns Decli. | |
| H. | M. | | | H. M. | H. M. | | D. M. | D. M. | | | D. M. | D. M. | |
| | | 1 | G | Vificat. Mar. | | 1 | 19 17 | 22 8 | | 1 | 19 4 | 22 10 | |
| 13 | 1 20 | 2 | A | 3 57 | 8 3 | 2 | 20 15 | 22 0 | | 2 | 20 1 | 22 2 | |
| 2 | 21 29 | 3 | B | Martin. | 2 | 3 | 21 12 | 21 51 | | 3 | 20 58 | 21 53 | |
| | | 4 | C | 3 59 | 8 1 | 4 | 22 9 | 21 42 | | 4 | 21 55 | 21 44 | |
| 10 | 10 10 | 5 | D | 4 1 | 7 59 | 5 | 23 6 | 21 32 | | 5 | 22 5 | 21 35 | |
| | | 6 | E | 4 2 | 7 58 | 6 | 24 3 | 21 23 | | 6 | 23 50 | 21 25 | |
| 18 | 6 19 | 7 | F | 4 3 | 7 57 | 7 | 25 0 | 21 12 | | 7 | 24 47 | 21 15 | |
| 7 | 19 0 | 8 | G | 4 4 | 7 56 | 8 | 25 58 | 21 2 | | 8 | 25 44 | 21 4 | |
| | | 9 | A | 4 5 | 7 55 | 9 | 26 55 | 20 51 | | 9 | 26 41 | 20 54 | |
| 15 | 7 41 | 10 | B | 4 6 | 7 54 | 10 | 27 52 | 20 40 | | 10 | 27 38 | 20 43 | |
| 4 | 3 50 | 11 | C | 4 7 | 7 53 | 11 | 28 49 | 20 28 | | 11 | 28 36 | 20 31 | |
| 12 | 16 31 | 12 | D | 4 8 | 7 52 | 12 | 29 47 | 20 16 | | 12 | 29 33 | 20 19 | |
| | | 13 | E | Sunne enters | | 13 | ♌ 44 | 20 4 | | 13 | ♌ 30 | 20 7 | |
| 1 | 12 40 | 14 | F | Leo. | 49 | 14 | 1 41 | 19 51 | | 14 | 1 27 | 19 54 | |
| | | 15 | G | Swithin. | 48 | 15 | 2 38 | 19 39 | | 15 | 2 25 | 19 41 | |
| 9 | 1 21 | 16 | A | 4 14 | 7 46 | 16 | 3 36 | 19 25 | | 16 | 3 22 | 19 28 | |
| 17 | 21 50 | 17 | B | 4 15 | 7 45 | 17 | 4 33 | 19 12 | | 17 | 4 19 | 19 15 | |
| | | 18 | C | 4 17 | 7 43 | 18 | 5 30 | 18 58 | | 18 | 5 17 | 19 1 | |
| 6 | 10 11 | 19 | D | Dog da. beg. | | 19 | 6 28 | 18 43 | | 19 | 6 14 | 18 47 | |
| 14 | 22 53 | 20 | E | Margaret. | | 20 | 7 25 | 18 29 | | 20 | 7 11 | 18 33 | |
| | | 21 | F | 4 21 | 7 39 | 21 | 8 23 | 18 14 | | 21 | 8 9 | 18 18 | |
| 3 | 19 1 | 22 | G | Magdalen. | | 22 | 9 20 | 17 59 | | 22 | 9 6 | 18 3 | |
| | | 23 | A | 4 25 | 7 35 | 23 | 10 17 | 17 14 | | 23 | 10 4 | 17 47 | |
| 11 | 7 43 | 24 | B | 4 26 | 7 34 | 24 | 11 15 | 17 28 | | 24 | 11 1 | 17 32 | |
| 19 | 3 51 | 25 | C | James Ap. | | 25 | 12 12 | 17 12 | | 25 | 11 58 | 17 16 | |
| 8 | 16 33 | 26 | D | Anna. | 7 30 | 26 | 13 10 | 16 56 | | 26 | 12 56 | 17 0 | |
| | | 27 | E | 4 31 | 7 29 | 27 | 14 7 | 16 39 | | 27 | 13 53 | 16 43 | |
| 16 | 12 41 | 28 | F | 4 33 | 7 27 | 28 | 15 5 | 16 22 | | 28 | 14 51 | 16 26 | |
| | | 29 | G | 4 35 | 7 25 | 29 | 16 2 | 16 5 | | 29 | 15 43 | 16 9 | |
| 5 | 1 23 | 30 | A | 4 36 | 7 24 | 30 | 17 0 | 15 48 | | 30 | 16 46 | 15 52 | |
| 13 | 14 4 | 31 | B | 4 38 | 7 22 | 31 | 17 58 | 15 30 | | 31 | 17 44 | 15 34 | |

North Declination decreasing.

# July.

| | Third year, ☉ in Cancer. | | | | Leape year ☉ in Cancer. | | | |
|---|---|---|---|---|---|---|---|---|
| 1591 | Suns Long. | | Suns Decli. | | 1592 | Suns Long. | | Suns Decli. | |
| | D. | M. | D. | M. | | D. | M. | D. | M. |
| 1 | 18 | 50 | 22 | 12 | 1 | 19 | 33 | 22 | 5 |
| 2 | 19 | 47 | 22 | 4 | 2 | 20 | 30 | 21 | 57 |
| 3 | 20 | 44 | 21 | 55 | 3 | 21 | 28 | 21 | 48 |
| 4 | 21 | 41 | 21 | 46 | 4 | 22 | 25 | 21 | 39 |
| 5 | 22 | 39 | 21 | 37 | 5 | 23 | 22 | 21 | 30 |
| 6 | 23 | 36 | 21 | 27 | 6 | 24 | 19 | 21 | 20 |
| 7 | 24 | 33 | 21 | 17 | 7 | 25 | 16 | 21 | 10 |
| 8 | 25 | 30 | 21 | 7 | 8 | 26 | 14 | 20 | 59 |
| 9 | 26 | 27 | 20 | 56 | 9 | 27 | 11 | 20 | 48 |
| 10 | 27 | 25 | 20 | 45 | 10 | 28 | 8 | 20 | 37 |
| 11 | 28 | 22 | 20 | 34 | 11 | 29 | 5 | 20 | 25 |
| 12 | 29 | 19 | 20 | 22 | 12 | ♌ | 2 | 20 | 13 |
| 13 | ♌ | 16 | 20 | 10 | 13 | 1 | 0 | 20 | 0 |
| 14 | 1 | 14 | 19 | 57 | 14 | 1 | 57 | 19 | 48 |
| 15 | 2 | 11 | 19 | 45 | 15 | 2 | 54 | 19 | 35 |
| 16 | 3 | 8 | 19 | 32 | 16 | 3 | 52 | 19 | 21 |
| 17 | 4 | 6 | 19 | 18 | 17 | 4 | 49 | 19 | 8 |
| 18 | 5 | 3 | 19 | 4 | 18 | 5 | 46 | 18 | 54 |
| 19 | 6 | 0 | 18 | 50 | 19 | 6 | 44 | 18 | 39 |
| 20 | 6 | 58 | 18 | 36 | 20 | 7 | 41 | 18 | 25 |
| 21 | 7 | 55 | 18 | 21 | 21 | 8 | 34 | 18 | 10 |
| 22 | 8 | 53 | 18 | 6 | 22 | 9 | 36 | 17 | 55 |
| 23 | 9 | 50 | 17 | 51 | 23 | 10 | 33 | 17 | 40 |
| 24 | 10 | 47 | 17 | 35 | 24 | 11 | 31 | 17 | 23 |
| 25 | 11 | 45 | 17 | 19 | 25 | 12 | 28 | 17 | 7 |
| 26 | 12 | 42 | 17 | 3 | 26 | 13 | 26 | 16 | 51 |
| 27 | 13 | 40 | 16 | 47 | 27 | 14 | 23 | 16 | 34 |
| 28 | 14 | 37 | 16 | 30 | 28 | 15 | 21 | 16 | 17 |
| 29 | 15 | 35 | 16 | 13 | 29 | 16 | 18 | 16 | 0 |
| 30 | 16 | 32 | 15 | 56 | 30 | 17 | 16 | 15 | 43 |
| 31 | 17 | 30 | 15 | 39 | 31 | 18 | 13 | 15 | 25 |

North Declination decreasing.

Note when the Sunnes mean Longitude (after the Apogæi is substracted) is between 4 Signes, and 8 Signes, or between 10 Signes and two Signes in stead of 96464, you must take 96476, to multiply your Tengent by.

## Example.

I would know the Sunnes true place the 7 of May 1638 at Rome, I take out the mean Longitude, and Apogæi for 1637 compleat, as before, and I take the mean Longitude, for Aprill compleat, which is 3 Signes 28 degr. and 1775 parts, and for 6 dayes compleat it is 5 degrees and 9139 parts. The whole sum is 13 Signes, 25 degrees and 1809 parts, the Apogæi for Aprill compleat is 55 parts: which added to the Apogæi for 1637, the summe is 3 Signes, 6 degrees, and 3744 parts, which substracted from the meane Longitude, the remainer is 10 Signes, 18 degrees, and 8065 parts; now because it is more than 6 Signes, I substract from it 6 Signes 00 deg. and 0333 parts (which I must always doe, when the remainer

# August hath xxxj. dayes.

| The Prime. | The time of the New Moon. H. | M. | Moneth day. | Weekly. | The English Kalender. Suns rising. H. | M | Suns setting. H. | M. | First year, ⊙ in Leo. 1 9 4 9 Suns Longi. D. | M. | Suns Decli. H. | M | Second year, ⊙ in Leo. 1 9 5 0 Suns Longi. D. | M. | Suns Decli. D. | M. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 1 | C | Lammas. | | | 20 | 1 | 18 | 55 | 15 | 12 | 1 | 18 | 41 | 15 | 17 |
| 2 | 10 | 13 | 2 | D | 4 | 41 | 7 | 19 | 2 | 19 | 53 | 14 | 54 | 2 | 19 | 39 | 14 | 59 |
| 10 | 22 | 54 | 3 | E | 4 | 43 | 7 | 17 | 3 | 20 | 50 | 14 | 26 | 3 | 20 | 37 | 14 | 40 |
| | | | 4 | F | 4 | 44 | 7 | 16 | 4 | 21 | 48 | 14 | 17 | 4 | 21 | 34 | 14 | 22 |
| 18 | 19 | 3 | 5 | G | 4 | 46 | 7 | 14 | 5 | 22 | 46 | 13 | 59 | 5 | 22 | 32 | 14 | 3 |
| | | | 6 | A | 4 | 48 | 7 | 12 | 6 | 23 | 44 | 13 | 39 | 6 | 23 | 30 | 13 | 44 |
| 7 | 7 | 44 | 7 | B | 4 | 50 | 7 | 10 | 7 | 24 | 41 | 13 | 20 | 7 | 24 | 27 | 13 | 25 |
| 15 | 20 | 25 | 8 | C | 4 | 52 | 7 | 8 | 8 | 25 | 39 | 13 | 1 | 8 | 25 | 25 | 13 | 5 |
| 4 | 16 | 34 | 9 | D | 4 | 53 | 7 | 7 | 9 | 26 | 37 | 12 | 41 | 9 | 26 | 23 | 12 | 46 |
| | | | 10 | E | Lawrence. | | | 5 | 10 | 27 | 35 | 12 | 21 | 10 | 27 | 21 | 12 | 26 |
| 12 | 5 | 15 | 11 | F | 4 | 57 | 7 | 3 | 11 | 28 | 32 | 12 | 2 | 11 | 28 | 19 | 12 | 6 |
| | | | 12 | G | 4 | 59 | 7 | 1 | 12 | 29 | 30 | 11 | 41 | 12 | 29 | 16 | 11 | 46 |
| 1 | 1 | 24 | 13 | A | Sun in *Virgo* | | | | 13 | 29 | 28 | 11 | 21 | 13 | 29 | 14 | 11 | 26 |
| 9 | 14 | 5 | 14 | B | 5 | 2 | 6 | 58 | 14 | 1 | 26 | 11 | 0 | 14 | 1 | 12 | 11 | 5 |
| | | | 15 | C | 5 | 4 | 6 | 56 | 15 | 2 | 24 | 10 | 39 | 15 | 2 | 10 | 10 | 44 |
| 17 | 10 | 14 | 16 | D | 5 | 6 | 6 | 54 | 16 | 3 | 22 | 10 | 18 | 16 | 3 | 8 | 10 | 23 |
| 6 | 22 | 55 | 17 | E | 5 | 8 | 6 | 52 | 17 | 4 | 20 | 9 | 57 | 17 | 4 | 6 | 10 | 2 |
| | | | 18 | F | 5 | 10 | 6 | 50 | 18 | 5 | 18 | 9 | 36 | 18 | 5 | 4 | 9 | 41 |
| 14 | 11 | 37 | 19 | G | 5 | 12 | 6 | 48 | 19 | 6 | 16 | 9 | 15 | 19 | 6 | 2 | 9 | 20 |
| | | | 20 | A | 5 | 14 | 6 | 46 | 20 | 7 | 14 | 8 | 53 | 20 | 7 | 0 | 8 | 58 |
| 3 | 7 | 45 | 21 | B | 5 | 16 | 6 | 44 | 21 | 8 | 13 | 8 | 31 | 21 | 7 | 59 | 8 | 36 |
| 11 | 20 | 27 | 22 | C | 5 | 18 | 6 | 42 | 22 | 9 | 11 | 8 | 9 | 22 | 8 | 57 | 8 | 15 |
| 19 | 16 | 36 | 23 | D | 5 | 20 | 6 | 40 | 23 | 10 | 9 | 7 | 47 | 23 | 9 | 55 | 7 | 53 |
| | | | 24 | E | Barth. | | | | 24 | 11 | 7 | 7 | 25 | 24 | 10 | 53 | 7 | 30 |
| 8 | 5 | 17 | 25 | F | 5 | 24 | 6 | 36 | 25 | 12 | 5 | 7 | 3 | 25 | 11 | 51 | 7 | 9 |
| | | | 26 | G | 5 | 26 | 6 | 34 | 26 | 13 | 4 | 6 | 41 | 26 | 12 | 50 | 6 | 46 |
| 16 | 1 | 26 | 27 | A | 5 | 28 | 6 | 32 | 27 | 14 | 2 | 6 | 18 | 27 | 13 | 48 | 6 | 24 |
| 5 | 14 | 7 | 28 | B | *Dog da.* end. | | | | 28 | 15 | 0 | 5 | 56 | 28 | 14 | 46 | 6 | 1 |
| | | | 29 | C | John behead | | | | 29 | 15 | 59 | 5 | 33 | 29 | 15 | 45 | 5 | 38 |
| 13 | 2 | 48 | 30 | D | 5 | 33 | 6 | 27 | 30 | 16 | 57 | 5 | 10 | 30 | 16 | 42 | 5 | 16 |
| 2 | 22 | 57 | 31 | E | 5 | 35 | 6 | 25 | 31 | 17 | 56 | 4 | 47 | 31 | 17 | 41 | 4 | 53 |

North Declination.

## August

| 1651 | Third year, ☉ in Leo. Suns Longi. D. M. | Suns Decli. D. M. | North Declination decreasing. | 1652 | Leap year ☉ in Leo. Suns Longi. D. M. | Suns Decli. D. M. |
|---|---|---|---|---|---|---|
| 1 | 18 27 | 15 21 | | 1 | 19 11 | 15 7 |
| 2 | 19 25 | 15 3 | | 2 | 20 9 | 14 49 |
| 3 | 20 23 | 14 45 | | 3 | 21 6 | 14 31 |
| 4 | 21 20 | 14 26 | | 4 | 22 4 | 14 12 |
| 5 | 22 18 | 14 8 | | 5 | 23 2 | 13 53 |
| 6 | 23 16 | 13 49 | | 6 | 24 0 | 13 34 |
| 7 | 24 13 | 13 30 | | 7 | 24 57 | 13 15 |
| 8 | 25 11 | 13 9 | | 8 | 25 55 | 12 55 |
| 9 | 26 9 | 12 51 | | 9 | 26 53 | 12 36 |
| 10 | 27 7 | 12 31 | | 10 | 27 51 | 12 16 |
| 11 | 28 5 | 12 11 | | 11 | 28 49 | 11 56 |
| 12 | 29 3 | 11 51 | | 12 | 29 46 | 11 36 |
| 13 | ♍ 0 | 11 31 | | 13 | ♍ 44 | 11 15 |
| 14 | 0 58 | 11 10 | | 14 | 1 42 | 10 54 |
| 15 | 1 56 | 10 49 | | 15 | 2 40 | 10 34 |
| 16 | 2 54 | 10 39 | | 16 | 3 38 | 10 13 |
| 17 | 3 52 | 10 8 | | 17 | 4 36 | 9 51 |
| 18 | 4 50 | 9 46 | | 18 | 5 34 | 9 30 |
| 19 | 5 48 | 9 25 | | 19 | 6 32 | 9 9 |
| 20 | 6 46 | 9 4 | | 20 | 7 30 | 8 47 |
| 21 | 7 45 | 8 42 | | 21 | 8 29 | 8 25 |
| 22 | 8 43 | 8 20 | | 22 | 9 27 | 8 3 |
| 23 | 9 41 | 7 58 | | 23 | 10 25 | 7 41 |
| 24 | 10 39 | 7 36 | | 24 | 11 23 | 7 19 |
| 25 | 11 37 | 7 14 | | 25 | 12 21 | 6 57 |
| 26 | 12 36 | 6 51 | | 26 | 13 20 | 6 34 |
| 27 | 13 34 | 6 29 | | 27 | 14 18 | 6 12 |
| 28 | 14 32 | 6 7 | | 28 | 15 16 | 5 50 |
| 29 | 15 30 | 5 44 | | 29 | 16 15 | 5 27 |
| 30 | 16 28 | 5 22 | | 30 | 17 13 | 5 4 |
| 31 | 17 27 | 4 59 | | 31 | 18 12 | 4 41 |

manner is more than five Sines) and the reſt is 4. ſines, 18 degrées and 7732 parts, the half whereof is 69 degrées and 3866 parts, that is 69 degrées, and 23 minutes: the Complement whereof is 20 degrées, 37 minutes, whoſe Tangent 37260, which I multiply by 96476, becauſe the meane Longitude is between ten Sines and two ſines, as is before noted, after the Apogæi is ſubtracted, and the Product is (cutting off five figures to the right hand) 36294, the Tangent of 19 degrées, and 57 minutes: the complement whereof is 70 degrées, 3 minutes, which being doubled is 140 degrées, 6 minutes, unto which I adde the 6 Sines, that was ſubtracted, viz. 180 degrées, 0 min. and alſo 96 degrées, 22 minutes, the Apogæi, the whole ſumme is 416 degrées 28 minutes: from which I ſubtract a whole Circle 360 degrées 0 minutes, and the remainer is 56 degrées, 28 minutes, the Sunnes place from the beginning of Aries, that is 26 degrées, 28 min. in Taurus, the 7 of May, 1638 at Noon.

# September hath xxx dayes.

| The Prime. | The time of the New Moon. H. | M. | Monthday. | Weekday | The English Kalender. | Suns rising H. | M. | Suns setting H. | M. | 1649 | First yeare, ☉ in Virgo. Suns Longi D. | M. | Suns Decli. D. | M. | North Declination decreasing. — South Declin. increasing. | 1650 | Second year ☉ in Virgo. Suns Longi D. | M. | Suns Decli. D. | M. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 1 | F | Giles. | 6 | 23 | | | 1 | 18 | 54 | 4 | 24 | | 1 | 18 | 40 | 4 | 30 |
| 10 | 11 | 38 | 2 | G | | 5 | 39 | 6 | 21 | 2 | 19 | 53 | 4 | 1 | | 2 | 19 | 38 | 4 | 7 |
| | | | 3 | A | | 5 | 41 | 6 | 19 | 3 | 20 | 51 | 3 | 38 | | 3 | 20 | 37 | 3 | 44 |
| 18 | 7 | 47 | 4 | B | | 5 | 43 | 6 | 17 | 4 | 21 | 50 | 3 | 15 | | 4 | 21 | 36 | 3 | 21 |
| 7 | 20 | 28 | 5 | C | | 5 | 45 | 6 | 15 | 5 | 22 | 48 | 2 | 52 | | 5 | 22 | 34 | 2 | 58 |
| | | | 6 | D | | 5 | 47 | 6 | 13 | 6 | 23 | 47 | 2 | 29 | | 6 | 23 | 33 | 2 | 34 |
| 15 | 9 | 9 | 7 | E | Nat. Elizab. | | | | | 7 | 24 | 46 | 2 | 5 | | 7 | 24 | 32 | 2 | 11 |
| 4 | 5 | 18 | 8 | F | Nativ. Mary | | | | | 8 | 25 | 44 | 1 | 42 | | 8 | 25 | 30 | 1 | 48 |
| 12 | 18 | 0 | 9 | G | | 1 | 53 | 6 | 7 | 9 | 26 | 43 | 1 | 19 | | 9 | 26 | 29 | 1 | 4 |
| | | | 10 | A | | 5 | 55 | 6 | 5 | 10 | 27 | 42 | 0 | 55 | | 10 | 27 | 28 | 1 | 1 |
| 1 | 14 | 8 | 11 | B | | 5 | 57 | 6 | 3 | 11 | 28 | 41 | 0 | 32 | | 11 | 28 | 27 | 0 | 37 |
| | | | 12 | C | | 5 | 59 | 6 | 1 | 12 | 29 | 40 | 0 | 8 | | 12 | 29 | 25 | 0 | 14 |
| 9 | 2 | 50 | 13 | D | Sun in Libra | | | | | 13 | ♎ | 39 | 0 | 16 | | 13 | ♎ | 24 | 0 | 10 |
| 17 | 22 | 58 | 14 | E | Holy Crosse. | | | | | 14 | 1 | 38 | 0 | 39 | | 14 | 1 | 23 | 0 | 33 |
| | | | 15 | F | | 6 | 5 | 5 | 55 | 15 | 2 | 37 | 1 | 3 | | 15 | 2 | 22 | 0 | 57 |
| 6 | 11 | 40 | 16 | G | | 6 | 7 | 5 | 53 | 16 | 3 | 36 | 1 | 26 | | 16 | 3 | 21 | 1 | 20 |
| | | | 17 | A | Lambert. | | | | 51 | 17 | 4 | 35 | 1 | 50 | | 17 | 4 | 20 | 1 | 44 |
| 14 | 0 | 21 | 18 | B | | 6 | 10 | 5 | 50 | 18 | 5 | 34 | 2 | 13 | | 18 | 5 | 19 | 2 | 7 |
| 3 | 20 | 40 | 19 | C | | 6 | 12 | 5 | 48 | 19 | 6 | 33 | 2 | 37 | | 19 | 6 | 18 | 2 | 31 |
| | | | 20 | D | | 6 | 14 | 5 | 46 | 20 | 7 | 32 | 3 | 0 | | 20 | 7 | 18 | 2 | 54 |
| 11 | 9 | 11 | 21 | E | Mathew A. | | | | | 21 | 8 | 31 | 3 | 23 | | 21 | 8 | 17 | 3 | 18 |
| 19 | 5 | 20 | 22 | F | | 6 | 18 | 5 | 42 | 22 | 9 | 30 | 3 | 47 | | 22 | 9 | 16 | 3 | 41 |
| 8 | 18 | 1 | 23 | G | | 6 | 20 | 5 | 40 | 23 | 10 | 29 | 4 | 10 | | 23 | 10 | 15 | 4 | 4 |
| | | | 24 | A | | 6 | 22 | 5 | 38 | 24 | 11 | 29 | 4 | 33 | | 24 | 11 | 15 | 4 | 28 |
| 16 | 14 | 10 | 25 | B | Cyprian. | | | | 36 | 25 | 12 | 28 | 4 | 57 | | 25 | 12 | 14 | 4 | 51 |
| | | | 26 | C | | 6 | 26 | 5 | 34 | 26 | 13 | 28 | 5 | 20 | | 26 | 13 | 13 | 5 | 14 |
| 5 | 2 | 51 | 27 | D | | 6 | 28 | 5 | 32 | 27 | 14 | 27 | 5 | 43 | | 27 | 14 | 13 | 5 | 38 |
| 13 | 15 | 32 | 28 | E | | 6 | 30 | 5 | 30 | 28 | 15 | 26 | 6 | 6 | | 28 | 15 | 12 | 6 | 0 |
| | | | 29 | F | Michael A. | | | | | 29 | 16 | 26 | 6 | 29 | | 29 | 16 | 11 | 6 | 23 |
| 2 | 11 | 41 | 30 | G | Hierom | 5 | 26 | | | 30 | 17 | 25 | 6 | 52 | | 30 | 17 | 11 | 6 | 46 |

## September.

| 1651 | Third year, ☉ in Virgo. Suns Longi. D. M. | Suns Decli. D. M. | North Declination decreasing. South Declin. increasing. | 1652 | Leap year, ☉ in Virgo. Suns Longi. D. M. | Suns Decli. D. M. |
|---|---|---|---|---|---|---|
| 1 | 18 26 | 4 35 | | 1 | 19 18 | 4 18 |
| 2 | 19 24 | 4 13 | | 2 | 20 9 | 3 55 |
| 3 | 20 21 | 4 49 | | 3 | 21 7 | 3 32 |
| 4 | 21 22 | 3 26 | | 4 | 22 6 | 3 9 |
| 5 | 22 20 | 3 3 | | 5 | 23 5 | 2 45 |
| 6 | 23 19 | 2 40 | | 6 | 24 3 | 2 22 |
| 7 | 24 17 | 2 17 | | 7 | 25 2 | 1 59 |
| 8 | 25 16 | 1 53 | | 8 | 26 1 | 1 35 |
| 9 | 26 15 | 1 30 | | 9 | 26 59 | 1 12 |
| 10 | 27 14 | 1 6 | | 10 | 27 58 | 0 49 |
| 11 | 28 12 | 0 43 | | 11 | 28 57 | 0 25 |
| 12 | 29 11 | 0 20 | | 12 | 29 56 | 0 2 |
| 13 | ♎ 10 | 0 4 | | 13 | ♎ 55 | 0 22 |
| 14 | 1 9 | 0 28 | | 14 | 1 54 | 0 45 |
| 15 | 2 8 | 0 51 | | 15 | 2 53 | 1 9 |
| 16 | 3 7 | 1 15 | | 16 | 3 52 | 1 33 |
| 17 | 4 6 | 1 38 | | 17 | 4 51 | 1 56 |
| 18 | 5 5 | 2 2 | | 18 | 5 50 | 2 19 |
| 19 | 6 4 | 2 25 | | 19 | 6 49 | 2 43 |
| 20 | 7 3 | 2 48 | | 20 | 7 48 | 3 6 |
| 21 | 8 3 | 3 12 | | 21 | 8 47 | 3 30 |
| 22 | 9 2 | 3 36 | | 22 | 9 47 | 3 53 |
| 23 | 10 1 | 3 59 | | 23 | 10 46 | 4 17 |
| 24 | 11 0 | 4 22 | | 24 | 11 45 | 4 40 |
| 25 | 12 0 | 4 46 | | 25 | 12 45 | 5 3 |
| 26 | 12 59 | 5 9 | | 26 | 13 44 | 5 26 |
| 27 | 13 58 | 5 32 | | 27 | 14 43 | 5 49 |
| 28 | 14 58 | 5 55 | | 28 | 15 43 | 6 12 |
| 29 | 15 57 | 6 14 | | 29 | 16 42 | 6 35 |
| 30 | 16 57 | 6 41 | | 30 | 17 42 | 6 58 |

If any man be pleased to worke this by the Logarithme Tangents, I have here therefore put the Logarithmes of those common nnmbers before set downe, viz. 96464, whose Logarith. is 99843654, and the Logarithme of 96476, is the Logarithm of 99844220. I have put down this easie way of finding the Sunnes place for their sakes that have occasion to use the Declination at Sea, which will serve in after time to finde the Suns Declination by the place (as is shewed by the first Astronomicall proposition by the Table of Sines) when the Tables of Declination in this Book shall need correction, although it find not the place to seconds, yet it differs not one Minute, which cannot breed Errour at all in the Suns Declination at any time; and therefore I expect a charitable censure concerning it.

### Another Example.

I desire to know the Sunnes place the 19th. of May, 1653 at 8 of the clock in

# October hath xxxj dayes.

| The time of the New Moon. H. M. | The Prime. | Mon th day. | Weeke day. | The English Kalender. Suns rising H. M. | Suns setting H. M. | First yeare, ⊙ in Libra. 1649 | Suns Longi D. M. | Suns Decli. D. M. | South Declination increasing. | Second year ⊙ in Libra. 1650 | Suns Longi D. M. | Suns Decli. D. M. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1 | A | 6 36 | 5 24 | 1 | 18 25 | 7 15 | | 1 | 18 11 | 7 9 |
| 10 0 22 | | 2 | B | 6 38 | 5 22 | 2 | 19 25 | 7 38 | | 2 | 19 10 | 7 32 |
| 18 20 31 | | 3 | C | 6 40 | 5 20 | 3 | 20 24 | 8 0 | | 3 | 20 10 | 7 55 |
| | | 4 | D | 6 42 | 5 18 | 4 | 21 24 | 8 22 | | 4 | 21 9 | 8 17 |
| 7 9 12 | | 5 | E | 6 44 | 5 16 | 5 | 22 24 | 8 45 | | 5 | 22 9 | 8 39 |
| 15 21 53 | | 6 | F | Faiths | 5 14 | 6 | 23 23 | 9 7 | | 6 | 23 9 | 9 2 |
| 4 18 2 | | 7 | G | 6 48 | 5 12 | 7 | 24 23 | 9 29 | | 7 | 24 9 | 9 24 |
| | | 8 | A | 6 50 | 5 10 | 8 | 25 23 | 9 51 | | 8 | 25 8 | 9 46 |
| 12 6 44 | | 9 | B | Denis | 5 8 | 9 | 26 23 | 10 13 | | 9 | 26 8 | 10 8 |
| | | 10 | C | 6 54 | 5 6 | 10 | 27 23 | 10 35 | | 10 | 27 8 | 10 29 |
| 1 2 52 | | 11 | D | 6 56 | 5 4 | 11 | 28 23 | 10 56 | | 11 | 28 8 | 10 51 |
| 9 15 34 | | 12 | E | 6 58 | 5 2 | 12 | 29 23 | 11 18 | | 12 | 29 8 | 11 12 |
| | | 13 | F | Edward. Sun | | 13 | m 23 | 11 39 | | 13 | m 8 | 11 34 |
| 17 11 42 | | 14 | G | in Scorpio | | 14 | 1 23 | 12 0 | | 14 | 1 8 | 11 55 |
| | | 15 | A | 7 3 | 4 57 | 15 | 2 23 | 12 21 | | 15 | 2 8 | 12 15 |
| 6 0 24 | | 16 | B | 7 5 | 4 55 | 16 | 3 23 | 12 41 | | 16 | 3 8 | 12 36 |
| 14 13 5 | | 17 | C | 7 7 | 4 53 | 17 | 4 23 | 13 2 | | 17 | 4 8 | 12 57 |
| | | 18 | D | Luke Evan | | 18 | 5 23 | 13 22 | | 18 | 5 8 | 13 17 |
| 3 9 24 | | 19 | E | 7 11 | 4 49 | 19 | 6 23 | 13 42 | | 19 | 6 9 | 13 37 |
| 11 21 55 | | 20 | F | 7 13 | 4 47 | 20 | 7 23 | 14 2 | | 20 | 7 9 | 13 57 |
| 19 18 4 | | 21 | G | 7 14 | 4 46 | 21 | 8 24 | 14 21 | | 21 | 8 9 | 14 16 |
| | | 22 | A | 7 16 | 4 44 | 22 | 9 24 | 14 41 | | 22 | 9 9 | 14 36 |
| 8 6 45 | | 23 | B | 7 18 | 4 42 | 23 | 10 24 | 15 0 | | 23 | 10 10 | 14 55 |
| | | 24 | C | 7 20 | 4 40 | 24 | 11 25 | 15 19 | | 24 | 11 10 | 15 14 |
| 16 2 54 | | 25 | D | Crispine. | 39 | 25 | 12 25 | 15 37 | | 25 | 12 10 | 15 33 |
| 5 15 35 | | 26 | E | 7 23 | 4 37 | 26 | 13 25 | 15 55 | | 26 | 13 11 | 15 51 |
| | | 27 | F | 7 25 | 4 35 | 27 | 14 26 | 16 14 | | 27 | 14 11 | 16 9 |
| 13 4 16 | | 28 | G | Sim. & Jud | | 28 | 15 26 | 16 31 | | 28 | 15 12 | 16 27 |
| | | 29 | A | 7 29 | 4 31 | 29 | 16 27 | 16 49 | | 29 | 16 12 | 16 45 |
| 2 0 25 | | 30 | B | 7 30 | 4 30 | 30 | 17 27 | 17 6 | | 30 | 17 13 | 17 2 |
| 10 12 6 | | 31 | C | 7 32 | 4 28 | 31 | 18 28 | 17 23 | | 31 | 18 13 | 17 19 |

# October.

| 1651 | Third year, ☉ in Libra. Suns Longi. D. M. | Suns Decli. D. M. | | Leap year, ☉ in Libra. 1652 Suns Longi. D. M. | Suns Decli. D. M. |
|---|---|---|---|---|---|
| 1 | 17 56 | 7 04 | | 1 18 41 | 7 21 |
| 2 | 18 56 | 7 26 | | 2 19 41 | 7 44 |
| 3 | 19 55 | 7 49 | | 3 20 41 | 8 6 |
| 4 | 20 55 | 8 12 | | 4 21 40 | 8 29 |
| 5 | 21 55 | 8 34 | | 5 22 40 | 8 51 |
| 6 | 22 54 | 8 56 | | 6 23 40 | 9 13 |
| 7 | 23 54 | 9 18 | | 7 24 40 | 9 35 |
| 8 | 24 54 | 9 40 | South Declination increasing. | 8 25 39 | 9 57 |
| 9 | 25 54 | 10 2 | | 9 26 39 | 10 19 |
| 10 | 26 54 | 10 24 | | 10 27 39 | 10 41 |
| 11 | 27 54 | 10 46 | | 11 28 39 | 11 2 |
| 12 | 28 54 | 11 7 | | 12 29 39 | 11 23 |
| 13 | 29 53 | 11 28 | | 13 m 39 | 11 44 |
| 14 | m 53 | 11 49 | | 14 1 39 | 12 5 |
| 15 | 1 54 | 12 11 | | 15 2 39 | 12 26 |
| 16 | 2 54 | 12 31 | | 16 3 39 | 12 47 |
| 17 | 3 54 | 12 52 | | 17 4 39 | 13 06 |
| 18 | 4 54 | 13 11 | | 18 5 40 | 13 27 |
| 19 | 5 54 | 13 32 | | 19 6 40 | 13 47 |
| 20 | 6 54 | 13 52 | | 20 7 40 | 14 7 |
| 21 | 7 55 | 14 12 | | 21 8 40 | 14 26 |
| 22 | 8 55 | 14 31 | | 22 9 40 | 14 46 |
| 23 | 9 55 | 14 50 | | 23 10 41 | 15 5 |
| 24 | 10 55 | 15 9 | | 24 11 41 | 15 24 |
| 25 | 11 56 | 15 28 | | 25 12 42 | 15 42 |
| 26 | 12 55 | 15 46 | | 26 13 42 | 16 0 |
| 27 | 13 57 | 16 5 | | 27 14 42 | 16 18 |
| 28 | 14 57 | 16 22 | | 28 15 43 | 16 36 |
| 29 | 15 58 | 16 41 | | 29 16 43 | 16 54 |
| 30 | 16 58 | 16 58 | | 30 17 44 | 17 11 |
| 31 | 17 59 | 17 15 | | 31 18 45 | 17 28 |

the fore-name, that must be as is before noted, the 17 day 20 hourrs after noon; first subtract 1637 out of 1651, and the remainer is 15 years, then I adde the equall motions of 1637, and 15 yeares, 4 moneths, 17 dayes and 20 houres, and the Apogæi of 1637, and of 15 years, and of Aprill compleat; and subtract one out of the other, the difference is 11 Sines, 0 degrees, and 5750 parts, from which I subtract 6 Sines, 0 degrees, 0333 parts, as is before noted, and the rest is 5 Sines, 00 degrees and 5417 parts, that is, 150 degrees, 5417 parts or 150 degrees 32 min. the half whereof is 75 degrees, 16 min. the complement is 14 deg. 44 minutes, whose Tangent is 26296, which multiplyed by 96476 (because the mean Longitude is between 10 Sines, and 2 sines, as is before noted) the Product in (cutting off five figures to the right hand) 25369, which is the Tangent of 14 deg. 14 min. whose Complement is 75 degr. 46 min. the double 151 deg. 32 min. unto which I adde 180 degrees 00 min. and

the

# November hath xxx. dayes.

| The Prime. | The time of the New Moon. H. M. | Month day. | Week day. | The English Kalender. | Sun. rising H. M | Suns setting. H. M. | 1 9 4 9 | First year, ⊙ in Scorpio. Suns Long D. M. | Suns Declin. H M | | 1 9 5 0 | Second year, ⊙ in Scorpio. Suns Long D. M. | Suns Declin. D. M. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1 | D | All Saints. | | | 1 | 19 28 | 17 40 | | 1 | 19 14 | 17 36 |
| 18 | 9 15 | 2 | E | | 7 36 | 4 24 | 2 | 20 29 | 17 56 | | 2 | 20 14 | 17 52 |
| 7 | 21 56 | 3 | F | | 7 37 | 4 23 | 3 | 21 30 | 18 12 | | 3 | 21 15 | 18 8 |
| | | 4 | G | | 7 39 | 4 21 | 4 | 22 30 | 18 28 | | 4 | 22 16 | 18 24 |
| 15 | 10 38 | 5 | A | Q. Vnder tr. | | | 5 | 23 31 | 18 43 | | 5 | 23 17 | 18 40 |
| 4 | 6 46 | 6 | B | Leonard. | | 17 | 6 | 24 32 | 18 58 | | 6 | 24 17 | 18 55 |
| 12 | 19 28 | 7 | C | | 7 44 | 4 16 | 7 | 25 33 | 19 13 | | 7 | 25 18 | 19 9 |
| | | 8 | D | | 7 45 | 4 15 | 8 | 26 33 | 19 27 | | 8 | 26 19 | 19 24 |
| 1 | 15 36 | 9 | E | | 7 47 | 4 13 | 9 | 27 34 | 19 41 | | 9 | 27 20 | 19 38 |
| | | 10 | F | | 7 48 | 4 12 | 10 | 28 35 | 19 55 | | 10 | 28 20 | 19 52 |
| 9 | 4 18 | 11 | G | Martin. | 4 | 11 | 11 | 29 36 | 20 8 | | 11 | 29 21 | 20 5 |
| | | 12 | A | Sun in Sagit. | | | 12 | ✗ 37 | 20 21 | | 12 | ✗ 22 | 20 18 |
| 17 | 0 26 | 13 | B | | 7 52 | 4 8 | 13 | 1 38 | 20 34 | | 13 | 1 23 | 20 31 |
| 6 | 13 8 | 14 | C | | 7 53 | 4 7 | 14 | 2 39 | 20 46 | | 14 | 2 24 | 20 47 |
| | | 15 | D | | 7 55 | 4 5 | 15 | 3 40 | 20 58 | | 15 | 3 25 | 20 55 |
| 14 | 1 49 | 16 | E | | 7 56 | 4 4 | 16 | 4 41 | 20 9 | | 16 | 4 26 | 21 6 |
| 3 | 22 8 | 17 | F | Hugh. | 4 | 3 | 17 | 5 42 | 21 20 | | 17 | 5 27 | 21 17 |
| | | 18 | G | | 7 58 | 4 2 | 18 | 6 43 | 21 31 | | 18 | 6 28 | 21 28 |
| 11 | 10 39 | 19 | A | | 7 59 | 4 1 | 19 | 7 44 | 21 41 | | 19 | 7 29 | 21 38 |
| 19 | 6 48 | 20 | B | Edmũd | 4 | 0 | 20 | 8 45 | 21 50 | | 20 | 8 30 | 21 48 |
| 8 | 19 29 | 21 | C | | 8 1 | 3 59 | 21 | 9 46 | 22 0 | | 21 | 9 31 | 21 57 |
| | | 22 | D | Cicily. | | 58 | 22 | 10 47 | 22 9 | | 22 | 10 32 | 22 5 |
| 16 | 15 38 | 23 | E | Clement. | | 57 | 23 | 11 48 | 22 17 | | 23 | 11 33 | 22 15 |
| | | 24 | F | | 8 4 | 3 56 | 24 | 12 49 | 22 25 | | 24 | 12 34 | 22 23 |
| 5 | 4 19 | 25 | G | Catherin. | | 55 | 25 | 13 50 | 22 33 | | 25 | 13 36 | 22 31 |
| 13 | 17 0 | 26 | A | | 8 6 | 3 54 | 26 | 14 51 | 22 40 | | 26 | 14 37 | 22 38 |
| | | 27 | B | | 8 7 | 3 53 | 27 | 15 53 | 22 46 | | 27 | 15 38 | 22 45 |
| 2 | 13 9 | 28 | C | | 8 8 | 3 52 | 28 | 16 54 | 22 53 | | 28 | 16 39 | 22 51 |
| | | 29 | D | | 8 9 | 3 51 | 29 | 17 51 | 22 58 | | 29 | 17 40 | 22 57 |
| 10 | 1 50 | 30 | E | Andrew Ap. | | | 30 | 18 56 | 23 4 | | 30 | 18 41 | 23 2 |

South Declination increasing.

| | Third year, ☉ in Scorpio. | | | | | Leape year ☉ in Scorpio. | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 1651 | Suns Longi | | Suns Decli. | | | 1652 | Suns Longi | | Suns Decli | |
| | D. | M. | D. | M. | | | D. | M. | D. | M. |
| 1 | 18 | 59 | 17 | 32 | | 1 | 19 | 45 | 17 | 44 |
| 2 | 20 | 0 | 17 | 48 | | 2 | 20 | 46 | 18 | 1 |
| 3 | 21 | 0 | 18 | 4 | | 3 | 21 | 46 | 18 | 16 |
| 4 | 22 | 1 | 18 | 20 | | 4 | 22 | 47 | 18 | 32 |
| 5 | 23 | 2 | 18 | 36 | | 5 | 23 | 48 | 18 | 47 |
| 6 | 24 | 3 | 18 | 51 | | 6 | 24 | 49 | 19 | 2 |
| 7 | 25 | 3 | 19 | 6 | | 7 | 25 | 49 | 19 | 17 |
| 8 | 26 | 4 | 19 | 20 | | 8 | 26 | 50 | 19 | 31 |
| 9 | 27 | 5 | 19 | 35 | South Declination increasing. | 9 | 27 | 51 | 19 | 45 |
| 10 | 28 | 6 | 19 | 48 | | 10 | 28 | 52 | 19 | 59 |
| 11 | 29 | 7 | 20 | 2 | | 11 | 29 | 53 | 20 | 12 |
| 12 | ♐ | 7 | 20 | 15 | | 12 | ♐ | 54 | 20 | 25 |
| 13 | 1 | 8 | 20 | 26 | | 13 | 1 | 55 | 20 | 37 |
| 14 | 2 | 9 | 20 | 40 | | 14 | 2 | 55 | 20 | 49 |
| 15 | 3 | 10 | 20 | 52 | | 15 | 3 | 56 | 21 | 1 |
| 16 | 4 | 11 | 21 | 3 | | 16 | 4 | 57 | 21 | 12 |
| 17 | 5 | 12 | 21 | 15 | | 17 | 5 | 58 | 21 | 23 |
| 18 | 6 | 13 | 21 | 25 | | 18 | 6 | 59 | 21 | 33 |
| 19 | 7 | 14 | 21 | 36 | | 19 | 8 | 0 | 21 | 43 |
| 20 | 8 | 15 | 21 | 46 | | 20 | 9 | 1 | 21 | 53 |
| 21 | 9 | 16 | 21 | 51 | | 21 | 10 | 3 | 22 | 2 |
| 22 | 10 | 17 | 22 | 4 | | 22 | 11 | 4 | 22 | 11 |
| 23 | 11 | 18 | 22 | 13 | | 23 | 12 | 5 | 22 | 19 |
| 24 | 12 | 20 | 22 | 21 | | 24 | 13 | 6 | 22 | 27 |
| 25 | 13 | 21 | 22 | 29 | | 25 | 14 | 7 | 22 | 35 |
| 26 | 14 | 22 | 22 | 36 | | 26 | 15 | 8 | 22 | 42 |
| 27 | 15 | 23 | 22 | 43 | | 27 | 16 | 9 | 22 | 48 |
| 28 | 16 | 24 | 22 | 50 | | 28 | 17 | 11 | 22 | 54 |
| 29 | 17 | 25 | 22 | 56 | | 29 | 18 | 12 | 23 | 0 |
| 30 | 18 | 27 | 23 | 1 | | 30 | 19 | 13 | 23 | 5 |

the Apogæi 96 Degrées 38 minutes, and from the sum subtract 360 degrées, 00 min. the remainer is 68 degrées, 10 minutes from the beginning of Aries, that is 8 degrées 10 min. in Gemini, the Sunnes true place, for the time given the 19 of May, 1653. at 8 of the clock in the fore-noone, after these 20 single yeares are past, you may adde the meane Longitude and Apogæi of 1637, and so make a new Epochæ or root for 1657, and so goe on with the 20 years again, untill you come to 1678, and then again make a new Epochæ or root, and so at the end of every 20 yeare.

The

# December hath xxxj. dayes.

| The Prime. | The time of the New Moon. H. M. | Moneth day. | Week day. | The English Kalender. Suns rising. H. M | Suns setting. H. M. | 1649 | First year, ☉ in Scorpio. Suns Longi. D. M. | Suns Decli. H M | 1650 | Second year, ☉ in Scorpio. Suns Longi. D. M. | Suns Decli. D. M. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 18 | 21 59 | 1 | F | 8 10 | 3 50 | 1 | 19 57 | 23 9 | 1 | 19 43 | 23 8 |
| | | 2 | G | 8 11 | 3 49 | 2 | 20 59 | 23 13 | 2 | 20 44 | 23 12 |
| 7 | 10 40 | 3 | A | 8 11 | 3 49 | 3 | 22 0 | 23 17 | 3 | 21 45 | 23 16 |
| 15 | 23 22 | 4 | B | 8 12 | 3 48 | 4 | 23 1 | 23 20 | 4 | 22 46 | 23 20 |
| 4 | 19 30 | 5 | C | 8 12 | 3 48 | 5 | 24 3 | 23 23 | 5 | 23 48 | 23 23 |
| | | 6 | D | 8 12 | 3 48 | 6 | 25 4 | 23 26 | 6 | 24 49 | 23 25 |
| 12 | 8 12 | 7 | E | 8 12 | 3 48 | 7 | 26 5 | 23 28 | 7 | 25 50 | 23 28 |
| | | 8 | F | Con. Mary. | | 8 | 27 6 | 23 30 | 8 | 26 52 | 23 29 |
| 1 | 4 20 | 9 | G | 8 13 | 3 47 | 9 | 28 8 | 23 31 | 9 | 27 53 | 23 30 |
| 9 | 17 2 | 10 | A | 8 13 | 3 47 | 10 | 29 9 | 23 31 | 10 | 28 54 | 23 31 |
| | | 11 | B | The short. da | | 11 | ♍ 10 | 23 32 | 11 | 29 55 | 23 32 |
| 17 | 13 10 | 12 | C | Sun in Capr. | | 12 | 1 12 | 23 31 | 12 | ♍ 57 | 23 31 |
| | | 13 | D | Lucie. | 3 47 | 13 | 2 13 | 23 30 | 13 | 1 58 | 23 31 |
| 6 | 1 52 | 14 | E | 8 13 | 3 47 | 14 | 3 14 | 23 29 | 14 | 2 59 | 23 29 |
| 14 | 14 33 | 15 | F | 8 13 | 3 47 | 15 | 4 16 | 23 27 | 15 | 4 1 | 23 28 |
| | | 16 | G | 8 12 | 3 48 | 16 | 5 17 | 23 25 | 16 | 5 2 | 23 26 |
| 3 | 10 52 | 17 | A | 8 12 | 3 48 | 17 | 6 18 | 23 22 | 17 | 6 3 | 23 23 |
| 11 | 23 23 | 18 | B | 8 12 | 3 48 | 18 | 7 20 | 23 19 | 18 | 7 5 | 23 20 |
| 19 | 19 32 | 19 | C | 8 11 | 3 49 | 19 | 8 21 | 23 16 | 19 | 8 6 | 23 17 |
| | | 20 | D | 8 11 | 3 49 | 20 | 9 22 | 23 12 | 20 | 9 7 | 23 13 |
| 8 | 8 13 | 21 | E | Thomas A. | | 21 | 10 24 | 23 7 | 21 | 10 9 | 23 8 |
| | | 22 | F | 8 10 | 3 50 | 22 | 11 25 | 23 2 | 22 | 11 10 | 23 3 |
| 16 | 4 22 | 23 | G | 8 9 | 3 51 | 23 | 12 26 | 22 56 | 23 | 12 11 | 22 58 |
| 5 | 17 3 | 24 | A | 8 8 | 3 52 | 24 | 13 27 | 22 51 | 24 | 13 13 | 22 52 |
| | | 25 | B | Thistsnat. | | 25 | 14 29 | 22 44 | 25 | 14 14 | 22 46 |
| 13 | 5 44 | 26 | C | Stephē M. | | 26 | 15 30 | 22 37 | 26 | 15 15 | 22 39 |
| | | 27 | D | John Evā. | | 27 | 16 31 | 22 30 | 27 | 16 17 | 22 32 |
| 2 | 1 53 | 28 | E | Innocētiat | | 28 | 17 33 | 22 22 | 28 | 17 18 | 22 24 |
| 10 | 14 34 | 29 | F | 8 4 | 3 56 | 29 | 18 34 | 22 14 | 29 | 18 19 | 22 16 |
| | | 30 | G | 8 3 | 3 57 | 30 | 19 35 | 22 5 | 30 | 19 20 | 22 8 |
| 18 | 10 43 | 31 | A | 8 2 | 3 58 | 31 | 20 36 | 21 56 | 31 | 20 22 | 21 58 |

South Declination.

# December.

| Dec. | Third year, ☉ in Sagitarius. Suns Longi. D. M. | Suns Decli. D. M. | Leap-Year. ☉ in Sagitarius. Suns Longi. D. M. | Suns Decli. D. M. |
|---|---|---|---|---|
| 1 | 19 28 | 23 6 | 20 14 | 23 10 |
| 2 | 20 29 | 23 11 | 21 15 | 23 14 |
| 3 | 21 30 | 23 15 | 22 17 | 23 18 |
| 4 | 22 32 | 23 19 | 23 18 | 23 21 |
| 5 | 23 33 | 23 22 | 24 19 | 23 24 |
| 6 | 24 34 | 23 25 | 25 21 | 23 27 |
| 7 | 25 35 | 23 27 | 26 22 | 23 29 |
| 8 | 26 37 | 23 29 | 27 23 | 23 30 |
| 9 | 27 38 | 23 30 | 28 24 | 23 31 |
| 10 | 28 39 | 23 31 | 29 26 | 23 31 |
| 11 | 29 41 | 23 32 | ♑ 27 | 23 31 |
| 12 | ♑ 42 | 23 31 | 1 28 | 23 31 |
| 13 | 1 43 | 23 31 | 2 30 | 23 30 |
| 14 | 2 45 | 23 30 | 3 31 | 23 29 |
| 15 | 3 46 | 23 28 | 4 32 | 23 27 |
| 16 | 4 47 | 23 26 | 5 34 | 23 24 |
| 17 | 5 49 | 23 24 | 6 35 | 23 22 |
| 18 | 6 50 | 23 21 | 7 36 | 23 18 |
| 19 | 7 51 | 23 17 | 8 38 | 23 15 |
| 20 | 8 53 | 23 14 | 9 39 | 23 10 |
| 21 | 9 54 | 23 9 | 10 40 | 23 6 |
| 22 | 10 55 | 23 4 | 11 42 | 23 0 |
| 23 | 11 57 | 22 59 | 12 43 | 22 55 |
| 24 | 12 58 | 22 53 | 13 44 | 22 49 |
| 25 | 13 59 | 22 41 | 14 46 | 22 42 |
| 26 | 15 0 | 22 41 | 15 47 | 22 35 |
| 27 | 16 2 | 22 33 | 16 48 | 22 28 |
| 28 | 17 3 | 22 26 | 17 49 | 22 20 |
| 29 | 18 4 | 22 18 | 18 51 | 22 12 |
| 30 | 19 6 | 22 10 | 19 52 | 22 3 |
| 1 | 20 7 | 22 1 | 20 53 | 21 54 |

South declination

## The use of the following Table of the Suns Declination.

The Suns greatest declination: according to the observation of Tycho Brahe, and Mr. Edward Wright 23 Deg. 31 Min. 30 seconds, and so it was in their times, but later observers have found it somewhat more, so that it amounts to in these times 23 deg. 32 m. or very little lesse; and therefore I have calculated this table to 23 deg. 32 min. for those which shall desire so much exactnesse.

The use of this Table is thus, if you would know the Declination of the Sun, in any Deg. and min. of the Ecliptick, first marke whether the Signe be at the head or the foot of the Table, if the Signe be at the top of the table, then count the degr. of the signe downward in the first Column of the table, but if the signe be at the foot of the table, then count the degr. upward, as in the last column of the table, and in the common angle, where the Character of the signe and the degree thereof meets, you shall have the Suns declination in deg. min. and seconds. And here note, if the place of the Sun have both deg. and min. you must see what

## A Table of the Suns Declination for every degree of the Ecliptick.

| Degrees | ♈ | | | ♉ | | | ♊ | | | Degrees |
|---|---|---|---|---|---|---|---|---|---|---|
| | ♓ | | | ♒ | | | ♑ | | | |
| | D. | M. | S. | D. | M. | S. | D. | M. | S. | |
| 0 | 0 | 0 | 0 | 11 | 30 | 58 | 26 | 13 | 47 | 30 |
| 1 | 0 | 23 | 57 | 11 | 52 | 2 | 20 | 26 | 23 | 29 |
| 2 | 0 | 47 | 54 | 12 | 12 | 54 | 20 | 38 | 35 | 28 |
| 3 | 1 | 11 | 51 | 12 | 33 | 36 | 20 | 50 | 25 | 27 |
| 4 | 1 | 35 | 46 | 12 | 54 | 6 | 21 | 1 | 51 | 26 |
| 5 | 1 | 59 | 39 | 13 | 14 | 22 | 21 | 12 | 55 | 25 |
| 6 | 2 | 23 | 31 | 13 | 34 | 25 | 21 | 23 | 35 | 24 |
| 7 | 2 | 47 | 21 | 13 | 54 | 14 | 21 | 33 | 50 | 23 |
| 8 | 3 | 11 | 8 | 14 | 13 | 50 | 21 | 43 | 42 | 22 |
| 9 | 3 | 34 | 52 | 14 | 33 | 11 | 21 | 53 | 10 | 21 |
| 10 | 3 | 58 | 33 | 14 | 52 | 18 | 22 | 2 | 13 | 20 |
| 11 | 4 | 22 | 11 | 15 | 11 | 10 | 22 | 10 | 51 | 19 |
| 12 | 4 | 45 | 45 | 15 | 29 | 46 | 22 | 19 | 03 | 18 |
| 13 | 5 | 9 | 13 | 15 | 48 | 6 | 22 | 26 | 51 | 17 |
| 14 | 5 | 32 | 36 | 16 | 6 | 11 | 22 | 34 | 13 | 16 |
| 15 | 5 | 55 | 55 | 16 | 23 | 58 | 22 | 41 | 9 | 15 |
| 16 | 6 | 19 | 8 | 16 | 41 | 30 | 22 | 47 | 49 | 14 |
| 17 | 6 | 42 | 15 | 16 | 58 | 46 | 22 | 53 | 44 | 13 |
| 18 | 7 | 5 | 15 | 17 | 15 | 42 | 22 | 59 | 21 | 12 |
| 19 | 7 | 28 | 9 | 17 | 32 | 18 | 23 | 4 | 32 | 11 |
| 20 | 7 | 50 | 56 | 17 | 48 | 38 | 23 | 9 | 17 | 10 |
| 21 | 8 | 13 | 37 | 18 | 4 | 40 | 23 | 13 | 35 | 9 |
| 22 | 8 | 36 | 9 | 18 | 20 | 21 | 23 | 17 | 27 | 8 |
| 23 | 8 | 58 | 33 | 18 | 35 | 43 | 23 | 20 | 51 | 7 |
| 24 | 9 | 20 | 48 | 18 | 50 | 46 | 23 | 23 | 48 | 6 |
| 25 | 9 | 42 | 54 | 19 | 5 | 28 | 23 | 26 | 18 | 5 |
| 26 | 10 | 4 | 50 | 19 | 19 | 51 | 23 | 28 | 21 | 4 |
| 27 | 10 | 26 | 38 | 19 | 33 | 52 | 23 | 29 | 57 | 3 |
| 28 | 10 | 48 | 16 | 19 | 47 | 32 | 23 | 31 | 5 | 2 |
| 29 | 11 | 9 | 43 | 20 | 0 | 50 | 23 | 31 | 46 | 1 |
| 30 | 11 | 30 | 58 | 20 | 13 | 47 | 23 | 32 | 0 | 0 |
| | ♍ | | | ♌ | | | ♋ | | | |
| | ♐ | | | ♏ | | | ♎ | | | |

is the difference of the Declination between the two next degrees, and by proportion, allow for the odde min.

Thus for Example.

The Suns place being 10 degr. of ♉ or ♍, you see the Characters of ♉, and ♍, are at the top of the table; therefore find out 10 in the first column, and in the same line under ♉, you shall find 14, 52, 18. that is 14 deg. 52 min. 18 sec. for the Declination.

But if you would know the Suns declination, being in 10 deg. of ♌ or ♒, then because the Characters are at the bottome of the Table, you must count the degr. upward in the last column, and so against 10 degr. you shall find 17 deg. 48 min. 38 sec. for the Suns declination.

But if the Sun were in 18 deg. 15 min. of ♉, first you see by the Table, that the 18 deg. of ♉ hath 17 deg. 15 m. 42 sec. for its Declination, and the 19 deg. hath 17 deg. 32 min. 18 sec. for its declination; the difference between them is 16 min. 36 sec. Then to find out by the Rule of proportion, how must you allow for the 15 min. Say if 60 minutes, give 16 min. 36 sec. What shall

shall 18 min. have and you shall finde 4 min. 9 seconds. Then consider by the order of the Table, whether this be to be added or subtracted. In this Examle, it is to be added to 17 deg. 15 min. 42 seconds, and so the Suns Declination will be 17 deg, 19 min. 51 seconds.

And after this manner you may try the Tables of the Sunnes Declination in the Ephemerides, or if need be you may rectifie them for the time to come. But in ordinary occasions you may leave out the seconds, unlesse they be more then 30, and then you may adde one to the min. for them.

# The use and explanation of the former EPHEMERIDES.

## To know the Longitude and Declination of the Sunne.

This is exactly calculated in the Ephemerides, for the Meridian of London, for the years 1649, 1650, 1651, 1652, so that you need but turne to the Moneth, and there, against the day of the Moneth, under that Section which is proper to the year, you shall finde the Longitude and Declination of the Sun desired.

### For Example.

If you would know the Suns place and Declination for the 12 day of April, Anno 1651, first look out the Moneth of April, then finde out the date of the year 1651, then against the 12 of April, in that Section, the Longitude of the Sun is 2 deg. 15 min. of ♉ and the Declinaton 12 deg, 18 min. North from the Equator. Now the reason why these Tables are calculated for 4 yeares, and neither more nor lesse, is this, because every fifth year, by reason of the one day put into the Leap-year, the Sun returnes unto the same place it was before without any sensible errour, for many years; so that these Tables may very well serve for 20 yeares to come, observing still their order from the Leap-year. But if you will be so exact, you may adde these few minutes set down in this Table to the place of the Sun, set down in the Kalender, and so you shall have the Suns place to a minute.

| First, | Second, | Third, | Leap-year, | Adde min. |
|---|---|---|---|---|
| 1649 | 1650 | 1651 | 1652 | 1 |
| 1653 | 1654 | 1655 | 1656 — | 2 |
| 1657 | 1658 | 1659 | 1660 — | 4 |
| 1661 | 1662 | 1663 | 1664 — | 6 |
| 1665 | 1666 | 1667 | 1668 — | 8 |
| 1669 | 1670 | 1671 | 1672 — | 10 |

By which Table you may see, that in 20 years, there will be but 10 min. difference in the Longitude of the Sun from the Ephemerides, and this difference of Longitude, will make but 4 min. difference, in the Suns Declination, even nèer the Equator, where it is most: but nèer the Tropicks of Cancer and Capricorn, it will be nothing at all. As for your satisfaction you may see by the Table of the Declination of the Sun.

For Example.

You would know the place and Declination of the Sun the 12 of April 1671. First, you must note that 1671 stands number 16 therefore you must look in that section for the day of the Month and finde 1671 you see there must be 10 min. added to the Longitude in the Table.

Now the Longitude of the Sun the 12 of April 1651 is (as was before found) 2 deg. 15 min. of ♉, to this add 10 min. and it makes makes 2 deg. 25 min. of ♉, and this in the Table of Declination will shew the Declination to be 12 deg. 22 min. almost where as the Declination set down in the Ephemerides is 12 deg. 18 min. so that there is scarce 4 min. difference in the Suns Declination in 20 years; which can make no sensible error in any use the Seaman will make of it.

Now this with much facility you may know the true Longitude and Declination of the Sunne, which how usefull it is for the finding of the Latitude of any place, and in the working of many other conclusions of the Sphеare, you shall hear more in its place.

## To know the time of the Moons Change, Full, and Quarters.

TO know the day and houre of the Conjunction or Change of the Moone, first look into the first Page of the Ephemerides, and right against the date of the year, you shall finde the Prime or golden Number, which you must remember, and also the Sunday letter for that year, then turn to the Moneth in which you would know the change of the Moone, and look out the Prime Number in the first Column, and by it in the second Column, you shall have the time of the change in houres and minutes, which houres and minutes you must alwayes reckon afternoon; then in the third Column you shall have the day of the moneth, and by the fourth you may know the day of the week.

### For Example.

Anno 1655, I would know the time of the new Moon in June, [illegible] Sunday letter [illegible] out the Prime 3 in the first Column, and it stands just against the 23 day, which by the Sunday letter you find to be Saturday, now for the time of the Change this day, in the second Column you finde 6 houres 17 min. which you must alwayes reckon to be after-noon. So that in your year 1655, it is new Moone the 23 of June being Saturday at 6 of the clock and 17 min. afternoon.

Here you must note, that if the houres and min. of the Change be above 12, then the Change is the next day in the morning according to ordinary account, but this way is altogether used by the Astronomers who begin the day at noone, and after a little use by this Table, you may readily understand it. For first——

1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12 houres after-noone, is the common reckoning. Then

13, 14, 15, 16, 17, 18, 19, 20 21, 22, 23 24, is all one, with——

1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12 the next morning.

Or else subtract 12 houres from the number, and the remainer is the time of the day the next morning.

This

Thus the same year 1655. the Prime being 3, in the Moneth of May, the Moon will change the 24 day, at 17 hour, 33 min. afternoon, that is at 5 of the clock 33 min. in the morning on the 25 day being Fryday.

And thus you may finde the time of the Quarters and full Moon by having the new Moone.

| If you adde these | days, | hou. | min. |
|---|---|---|---|
| For the first quarter, | 7 | 9 | 11 |
| For the full Moone, | 14 | 18 | 22 |
| For the last quarter, | 22 | 3 | 33 |
| And the whole time from Moone to Moone, is | 29 | 12 | 44 |

Thus you shall have the Change of the Moone and Quarters according to her Equall motions, which will be best considering the following conclusions.

## To know what Signe the Moone is in.

TO this purpose, you must remember that the 12 Signes are thus to be numbred by Astronomers,

Aries, Taurus, Gemini, Cancer, Leo, Virgo.

0 1 2 3 4 5

Libra, Scorpio, Sagitarius, Capricorne, Aquarius, Pisces.

6 7 8 9 10 11

Now at the Change, the Sun and Moone are both in one signe and degree, which in the former Example of the new Moone the 23 of June is 12 deg. of Cancer, for that is the place of the Sun according to the Ephemerides, the which you must set downe thus. —— 3 Sin. 12 deg. 0 min.

## A Table shewing the Moones motion in Signes, Degr. and Minutes, for every Day and houre of her Age.

| The days of the Moones age. | S. | D. | M. | The houres of the Moones Age. | D. | M. |
|---|---|---|---|---|---|---|
| 1 | 0 | 13 | 11 | 1 | 0 | 33 |
| 2 | 0 | 26 | 21 | 2 | 1 | 6 |
| 3 | 1 | 9 | 32 | 3 | 1 | 39 |
| 4 | 1 | 22 | 42 | 4 | 2 | 12 |
| 5 | 2 | 5 | 53 | 5 | 2 | 45 |
| 6 | 2 | 19 | 3 | 6 | 3 | 18 |
| 7 | 3 | 2 | 14 | 7 | 3 | 51 |
| 8 | 3 | 15 | 25 | 8 | 4 | 24 |
| 9 | 3 | 28 | 35 | 9 | 4 | 56 |
| 10 | 4 | 11 | 46 | 10 | 5 | 29 |
| 11 | 4 | 24 | 56 | 11 | 6 | 2 |
| 12 | 5 | 8 | 7 | 12 | 6 | 35 |
| 13 | 5 | 21 | 18 | 13 | 7 | 8 |
| 14 | 6 | 4 | 28 | 14 | 7 | 41 |
| 15 | 6 | 17 | 39 | 15 | 8 | 14 |
| 16 | 7 | 0 | 49 | 16 | 8 | 47 |
| 17 | 7 | 14 | 0 | 17 | 9 | 20 |
| 18 | 7 | 27 | 11 | 18 | 9 | 53 |
| 19 | 8 | 10 | 21 | 19 | 10 | 26 |
| 20 | 8 | 23 | 32 | 20 | 10 | 59 |
| 21 | 9 | 6 | 42 | 21 | 11 | 32 |
| 22 | 9 | 19 | 53 | 22 | 12 | 5 |
| 23 | 10 | 3 | 3 | 23 | 12 | 38 |
| 24 | 10 | 16 | 14 | 24 | 13 | 11 |
| 25 | 10 | 29 | 25 | | | |
| 26 | 11 | 12 | 35 | | | |
| 27 | 11 | 29 | 46 | | | |
| 28 | 0 | 8 | 56 | | | |
| 29 | 0 | 22 | 7 | | | |
| 30 | | | | | | |

Now by this Table knowing the age of the Moone since the Change, you may see how much must be added to the place of the Moon that she then was in, and if it shall come to more signes then 12, you must cast 12 away, and that which remaines will shew the Signe, deg. and min. the Moone is in.

For Example.

Suppose you would know the Moons place the last of June at Noone, Anno 1655. the Change was the 23 day, at 6 houres at night. Therefore the 30 day at noone, the Moone is 6 days and 18 houres old. Now the place of the Sunne and Moone at the Change was as was shewed before —— 3 Sign. 12 deg. 0 min.

| | | | |
|---|---|---|---|
| The Moones motion for 6. dayes is —— | 2 | 19 | 3 |
| And for 18 hours | 0 | 9 | 53 |
| The summe is | 6 | 10 | 56 |

That is in 16 degr. of Libra.

Or else you may multiply the Moones age by 2 and divide the product by 5, and the Quotient will

## A Table shewing the time of the Moones comming to the South, by her Age.

| The dayes of the Moones age. | H. | M. | The houres of the Moones age. | Min. |
|---|---|---|---|---|
| 1 | 0 | 49 | 1 | 2 |
| 2 | 1 | 38 | 2 | 4 |
| 3 | 2 | 26 | 3 | 6 |
| 4 | 3 | 15 | 4 | 8 |
| 5 | 4 | 3 | 5 | 10 |
| 6 | 4 | 53 | 6 | 12 |
| 7 | 5 | 41 | 7 | 14 |
| 8 | 6 | 30 | 8 | 16 |
| 9 | 7 | 19 | 9 | 18 |
| 10 | 8 | 8 | 10 | 20 |
| 11 | 8 | 56 | 11 | 22 |
| 12 | 9 | 45 | 12 | 24 |
| 13 | 10 | 34 | 13 | 26 |
| 14 | 11 | 25 | 14 | 28 |
| 15 | 12 | 11 | 15 | 30 |
| 16 | 1 | 0 | 16 | 32 |
| 17 | 1 | 49 | 17 | 34 |
| 18 | 2 | 38 | 18 | 36 |
| 19 | 3 | 26 | 19 | 38 |
| 20 | 4 | 15 | 20 | 40 |
| 21 | 5 | 3 | 21 | 43 |
| 22 | 5 | 53 | 22 | 45 |
| 23 | 6 | 41 | 23 | 47 |
| 24 | 7 | 30 | 24 | 49 |
| 25 | 8 | 19 | | |
| 26 | 9 | 8 | | |
| 27 | 9 | 56 | | |
| 28 | 10 | 45 | | |
| 29 | 11 | 34 | | |
| 30 | | | | |

After-noone. Morning.

will shew you how many houres, and the equations so many times 6 points as the Moone is gone from that signe and deg. where the Sun is at that present time.

The use of this Table is thus.

KNowing as before the time of the new Moon, you may easily know her Age any day at Noon, in dayes and houres.

When see what time is allowed for the Dayes, and after for the odde Houres, and adde them together; lastly, see how many minutes is to be allowed for this time, and the sum of all, will be the time of the Moones comming to the South.

For Example

Suppose, the Moone be any day at Noone 10 dayes and 8 houres old, the Table will shew first,

For the 10 days 8 hou. 8 min.
For the 8 houres, 0 — 16 —
which is 8 — 24 —
Now the 8 hou. 24, requires 0 — 17 —
all which is the time 8 — 41 —
of the Moones comming to the South.

Or else you may doe this by the Instrument, page the 8. thus, Turn the moveable Circle, so that the age of the Moone may be upon the North or South point of the Compasse, and the Inder will shew the time of the Moones comming to the South.

Or else by Arithmetick, multiply the Moones Age by 12, and divide the Product by 15, so the Quotient will shew the houre of the Moones comming to the South; and if any thing remaine, multiply it by 4, and that will shew the minutes, to be added to the houres of the Quotient, and so you shall have the time of the Moones comming to the South.

This knowledge of the Moones comming to the South is very necessary for many purposes; for first, hereby you may know the time of high Tide at any place, as is shewed before.

Secondly, knowing the time of the Moones comming to the South, you may know the time of the night, by the shining of the Moone upon any Sun-dyall. Thus,

Observe by a Sun-dyall as if you would see what a clock it were by the Moone, and observe how much the shadow of the Moon doth either lack, or is past the 12, upon the Dyall; for so much it doth want of, or is past the time of the Moones comming to the South.

For Example.

Suppose as before, the Moone did come to the South at 8 houres 41 min. afternoon, and the shadow of the Moone upon the Dyall were at 10, his wants 2 houres of 12; and therefore it wants 2. houres of 8 houres 41 min, so that it is 6 of the clock and 41 min. But if the shadow of the Moone had been at 2 upon the dyall, then you must have added two, houres to the Moones comming to the South, and so it had been 10 hou. 41 min. at night.

Againe, by the time of the Moones comming to the South, and the place of the Moone in the Zodiack, you may know the time of the Moones rising and setting, as thus. Knowing what sine and degree the Moone is in as before, look out when the Sun is in that sine and deg. in the Ephemerides, and right against it in the proper column, you shall finde the time of the Suns setting, when the Sun is in that sine and degree, this time is halfe the diurnall arch belonging to that sine and degree of the Ecliptick, which being added

to the time of the Mones being South, it will shew the time of the Mones setting, and if you subtract it from the Mones being South, it will shew her rising.

For Example.

Suppose the Mone to be in 10 degrées of Taurus, and the time of her comming to the South at 10 of the clock at Night. First, I lok when the Sun is in 10 degrées of Taurus, and that is the 20.th of Aprill, and the time of Sun-set, that day is 7 houres 18 min. this added to 10 houres, the time of the Mones being South, is 17 houres 18 min. which is 5 of the clock and 18 min. the next morning, for the time of the Mones setting; likewise this subtracted from 10 houres, there remaines 2 houres 42 min. the time of the Mones rising.

## To finde the length of the day and night.

In the fift Column of the Kalender, (among the fixed Feasts) you have the time of the Suns rising and setting, by which you may know the length of the day and night: for, the houres and min. of the Suns rising being doubled, gives the length of the Night, and the houres and min. of the Suns setting being double, gives the length of the day.

## How to use the Sunnes Declination, thereby to finde out the Elevation of the Pole.

TO finde out the Altitude or height of the Poles in any severall Latitude, viz. How much the Pole is raised above your Horizon in degrées and minutes. It is necessary, first to take by observation, the Meridian Altitude of the Sunne, which Meridian Altitude is known, by taking the height of the Sunne that day, in which you would observe, just at none: at which time, the sun is highest, being then also upon the Meridian: which found, note it down in paper or slate: then knowing the year of our Lord, with the Moneth in which you are, and also the day of the Moneth, loke in the Kalender before spoken of, for the moneth and day thereof, and right against the said day of the moneth, towards the right hand, under ye title Declin. of the Sun, you shall see the several years, which the said Table of Declination serve

ſerue ſor. If it be the Leap-year, look in the laſt of the ſaid 4 Tables, under the title Leap, year: If it be the firſt year after Leap-year, then reſort to the firſt of the ſaid Tables under the title Firſt: and ſo of the ſecond and third, and after thoſe 4 yeares are paſt, come back again to the firſt, and proceed as you did before: then (as I ſaid) having found out the Moneth, Day, and Year, direct your eye downward toward the foot of that Table, in the Table which ſerues for the year propoſed, till you finde a number making a right angle, with the day of your moneth: or more plainly looke what number in the laſt Column of your year, is right againſt the day of your moneth: which numbers are the Declination for the day deſired: and being two numbers in the ſaid Column, the firſt are degrées, the other minutes: then regard alſo, whether the Sun hath North Declination or South Declination, which is ſet down between the ſeverall ſpaces: where by the way you ſhall note, that from the Sunnes entrance into Aries, which is about the 11 of March, till his entrance into Libra, which is about the 13 of September, he hath North Declination: and from the ſaid 13 of September, till his entrance into Aries again, South Declination: the ſaid Declination, encreaſing according to the Sunnes Progreſſe through the Signes from his entrance into Aries, till his entrance into Cancer, and decreaſing from Cancer, to the beginning of Libra, then againe increaſing from Libra to Capricorn, and decreaſing from Capricorn to the end of Piſces, and beginning of Aries. Aries, Taurus, Gemini, Cancer, Leo, and Virgo, being Signes having North Declination from the Equinoctiall Circle: and Libra, Scorpio, Sagitarius, Capricornus, Aquarius, and Piſces South, Signes having South Declination from that Circle: then knowing (as I haue ſaid) the Meridian Altitude of the Sunne, the Declination of the Sunne, and whether the Sunne hath South or North Declination; as theſe three things are alwayes to be conſidered, in knowing the height of the Pole. If the Declination be North, ſubtract the Declination from the Meridian Altitude, the remainer is the Elevation of the interſection or cutting of the Equinoctiall with the Meridian above the Horizon, which in common termes is the Elevation of the Equinoctiall above the Horizon: which height of the Equinoctial, taken from 90,

leaveth the height of the Pole, or the Latitude of the place of your observation. But contrariwise, if the Sun hath South Declination, adde the said Declination to the Meridian Altitude, the Product is the height of the Equinoctiall, which likewise taken from 90, leaveth also the height of the Pole.

Example.

I observed the 11 of Iuly 1652. in the City of London, and found the Meridian Altitude of the Sunne to be 58 deg. 54 min. and the Declination of the Sun North 20 deg. 25 min. Being that the Declination was North, I subtracted 20 deg. 25 min. the Declination of the Sun at noon: the remainer was 38 deg. 29 min. the height of the Equinoctiall: that taken from 90 leaves 51 deg. 31 min. for the height of the Pole, or Latitude of London.

This Rule is to be understood, when you are betwéen the Equinoctiall and the North Pole, and the Sun to the Southward of you: But if you should be betwéen the Equinoctiall and the South Pole, and the Sun North from you, then must you work contrary: for then if the Sun hath South Declination, you must subtract the Declination from the Meridian Altitude, and if the Sun hath North Declination, you must adde the said Declination to the Meridian Altitude.

As for Example.

Being at Sea to the Southwards of the Line the 4 of January 1652. suppose that you observe the height of the Sun at noone and finde it to be 66 deg. 24 min, then you shall finde the Declination to be 21 deg. 27 min. to the Southwards, which subtracted from 66 deg. 24 min. the Meridian Altitude leaves 45 deg. 3 min. for the height of the Equinoctiall: that taken from 90 rests 44 deg. 57 min. for the height of the South Pole above the Horizon,

Again, suppose that being at Sea the 10 of May, 1652, and observing the Sun, you take the Altitude at noon 60 deg. 30 min. and his declination then is 20 deg. 5 min. Northwards, but then not having observed long before, you know not whether you are to the Northwards of the Equinoctiall or to the Southward of the said Line, to know which, set the Sunne by your Compasse, and marke which way the shadow of the Sun streeketh: for if he casteth his shadow the same way that the Declination is, then is the

sun

sun betwixt the Equinoctiall and you, your self being also the same way that the Suns Declination is: and therefore subtracting the Declination 20 deg. 13 min. from 60 deg. 30 min. the Meridian Altitude, rests 40 deg. 17 min. the height of the Equinoctiall, the complement whereof 49 deg. 43 min. is the Elevation of the North Pole: but if the Sun casts his shadow contrary to his Declination, that is to say, If having North Declination, his shadow goeth Southward, or having South Declination, casts his shadow Northwards: Then either the Equinoctiall shall be betwixt you and the Sun, or you in the Equinoctiall; or else you shall be betwixt the Equinoctiall and the Sun: which to know, adde the Declination and the Meridian Altitude for the day proposed together: If the summe of the addition be lesse than 90 deg. so much as it wanteth of 90 deg. shall you be distant from the Equinoctiall that way which the shadow streketh: If it be just 90 deg. then are you under the Equinoctiall, Again, if your said Meridian Altitude and Declination added, passeth 90 deg. then so much as is overplus, you shall be from the Equinoctiall towards the Sun, and then also you shall be betwixt the Equinoctiall and the Sun, and if you finde the Sun to be in your Zenith, so much as is the Declination shall you be from the Equinoctiall, that way that the Sun declineth: By which reason if the Sun be in your Zenith, that is 90 deg. high, and hath no Declination, then are you under the Equinoctiall.

## How to appropriate the Tables of Declination to any other Meridian.

THere is in the oft using the Suns declination, one principall thing to be considered, which is, that a Table of declination, made for any particular place, doth not serve generally for all places, but only for such places as have the like or neer the same Longitude. The reason is, because that the Declination is calculated according to the true place of the Sun at noon, at which time the Sun is upon the Meridian at that place, for which the said Tables are made: But you must note that the Sun doth not come to the Meridian in all places at a like time, although that in all places the sun being upon the Meridian, makes the middle of the day. But for every 15 deg. difference of Longitude betweén

any

any two places, the Sun comes sooner or later to the Meridian by so many hours. So that if a place be 15 degrées to the Eastward of the place prefixed, then the Sun comes sooner to the Meridian by an hour, and if it be 15 deg. to the Westward, later by an hour. And so consequently more or lesse, according to the difference of Longitude. By which reason, in what part of the world soever you be, you may work for the declination of the Sun in that place by the proportionall parts of 24 houres declination to the hour of difference in Longitude. As for Example.

Being in Brasilia (a part of the West-Indies) the 10 of Aprill, this year 1652, whose Meridian is distant from the Meridian of England, to the Westward about 45 deg. which is 3 hours of time that the Sunne should come to the Meridian later there, than here at London where the Table is made: For when it is 12 a clock here, it is but 9 there, and being noon there, it is 3 a clock here. Therefore to apply this Table to that place, I finde the Declination for the day aforesaid under our Meridian, to be 11 deg. 53 min. at noon, and by reason, that when it is 12 a clock at Brasilia, it is then at London 3 hours past. Therefore by the rule of proportion, I seek what declination the Sun hath at three a clock after noon, as followeth, I take the difference of the declination betwéen the day aforesaid, and the next following, which is 20 min. then I say by the rule of 3. if 24 hours give 20 min. what gives 3 hours the time of the difference in Longitude. Facit 2 min. and 30 seconds, which (because the declination increases) I adde to the number of the day proposed, so I conclude, the Declination of the Sun to be the 10 of April, at noon in the Kingdome of Brasilia 11 deg. 55 min. and ½.

Again, the day and time aforesaid, in the Bay of St. Sebastian, whose Longitude is 58 deg. to the Eastward of London, answering néer to 4 hours of time, shewing that the Sun comes sooner to the meridian in the Bay of St. Sebastian, by 4 hours then at London: by which reason the declination is lesse there than at London, because the declination doth increase: For if the declination did decrease, it would be more there than at London: and to know the declination of the Sun in the Bay aforesaid: I take the difference betwixt the Declination of the 10 of Aprill, and the Declination of the day next before being 20 min. Then (I say) if 24 houres

gives

gives 20 min. what 4 houres? Facit 3 min. which deducted from 11 deg. 43 min. the Declination of the Sun the 10 of April aforesaid at London, leaveth 11 deg. 50 min. The Declination of the Sun at noone in the Bay of S. Sebastian, being that when it is 12 of the clock there it is but 8 a clock at London: or in any place, having the same Longitude.

## How to observe the height of the Pole by the Starres.

THe working thereof by the Starres, to finde the height of the Pole, is all alike with the working thereof by the Sun, for if you observe any Star upon the Meridian: look in the Table of the fixed Starres, for the name of the Star which you observed, where you shall finde his Declination either North or South, and the right Ascension thereof in deg. and hundred parts, and having taken the Altitude of any Starre upon the Meridian, you have nothing to mark in the Table for this, but the Declination, which if it be North, take the Declination of the Starre from the height thereof: The remainer taken from 90, leaveth the height of the Pole: but if the Star hath South Declination, adde the Declination to the Altitude taken, and the Product thereof taken from 90, leaves the height of the Pole: Also to finde the time of any Starres comming to the Meridian, is set down after the Tables of the Suns right Ascension, but for the first day of every Moneth, you have it in the Table of the Starres.

### Example.

The 25 of November 1638, I observed a Starre of the second bignesse in the wing of Pegasus, or the Flying Horse, about 8 of the clock in the evening, and found the Meridian Altitude thereof to be 51 deg. 45 min. and in the Table of the fixed Starres, I finde the said Starre to have 13 deg. 17 min. North Declination: which taken from 51 deg, 45 min. the height observed, leaves 38 deg. 28 min. the height of the Equinoctiall: the Complement whereof 51 deg. 32 min. is the height of the North Pole at London.

And so consequently, for all those Starres whose Declination is taken from the Equinoctiall: but for those Starres which are any thing near to the Pole, whose distance or Declination is counted from the Pole, their working is thus: You must note, that being farre to the Northward, some of those Starres will be twice

twice upon the Meridian, viz. once above the Pole, and once under the Pole: Therefore if you observe any star upon the Meridian under the Pole, adde the distance, of the said star from the Pole to your Altitude observed, the totall is the height of the Pole: But if you observe any star upon the Meridian above the Pole, so much as is the distance or declination of the said star from the Pole, you must take from the Altitude taken, the remainer is the height of the Pole.

As for Example.

If at London you observe the former Guard Starre beneath the Pole upon the Meridian, you shall finde it to be 37 deg, 16 min, to which if you adde 14 deg, 16 min. the distance of the said star from the Pole, the totall is 51 deg. 32 min. the height of the North Pole at London. Again, the same star observed upon the Meridian above the Pole is 65 deg, 48 min. from which 14 deg. 16 min. the distance aforesaid taken, leaveth 51 deg. 32 min. as before,

Note that being farre Northward, those Stars between the Equinoctiall and Tropick of Cancer are best to observe, and being between the said Tropick and the Equinoctiall, those stars above the Pole are fittest for observation, and for those that travell farre beyond the Line to the Southwards: the like order must be kept by the stars, between the Equinoctiall and the Tropick of Capricornus, and those that are nèer the South Pole.

And whereas the North star being very nèer the Pole (and by report) is of most Sea-men only made use of for observation, in our Northern Navigations. Therefore considering the great use that is made of it, I have calculated an exact Table for the declination of the North Starre, from the Zenith (in seven severall Latitudes, viz. Latitude, 20, 30, 40, 50, 60, 70, 80. upon every severall point of the Compasse) because the said star hath not the same Altitude above the Horizon in one Latitude, as it hath in another, the guards being upon the same point of the Compasse, as you may see in the Table following, yet the difference is not so great as some have supposed. It is very commodious, because whereas other stars are onely to be observed upon the Meridian, this star by the help of this Table, may be observed at any time of the night, whose use followeth.

If

☞ If the former Guard be — Then the Pole Starre is — Under the Pole.

| Points of the Compasse. | Latit 20 D. M. | Latit 30 D. M. | Latit 40 D. M. | Latit 50 D. M. | Latit 60 D. M. | Latit 70 D. M. | Latit 80 D. M. | Declination |
|---|---|---|---|---|---|---|---|---|
| N. W. by W. | 0 00 | 0 00 | 0 00 | 0 00 | 0 00 | 0 3 | 0 15 | |
| Northwest. | 0 24 | 0 25 | 0 25 | 0 27 | 0 29 | 0 33 | 0 42 | |
| N. W. by N. | 0 54 | 0 55 | 0 56 | 0 57 | 0 58 | 1 1 | 1 10 | |
| N. N W. | 1 22 | 1 23 | 1 23 | 1 24 | 1 25 | 1 28 | 1 34 | |
| N. by W. | 1 48 | 1 48 | 1 49 | 1 50 | 1 50 | 1 53 | 1 57 | |
| North. | 2 8 | 2 8 | 2 3 | 2 8 | 2 8 | 2 10 | 2 13 | |
| N. by E. | 2 23 | 2 23 | 2 24 | 2 24 | 2 24 | 2 25 | 2 26 | |
| N. N E. | 2 34 | 2 34 | 2 34 | 2 34 | 2 34 | 2 35 | 2 35 | |
| N. E by N. | 2 38 | 2 38 | 2 38 | 2 38 | 2 38 | 2 38 | 2 38 | |
| Northeast. | 2 37 | 2 37 | 2 37 | 2 37 | 2 37 | 2 37 | 2 37 | |
| N E. by E. | 2 29 | 2 29 | 2 29 | 2 29 | 2 30 | 2 30 | 2 31 | |
| E. N E. | 2 16 | 2 17 | 2 17 | 2 17 | 2 18 | 2 19 | 2 22 | |
| E. by N. | 1 59 | 1 59 | 1 59 | 2 0 | 2 1 | 2 2 | 2 6 | |
| East. | 1 35 | 1 35 | 1 36 | 1 37 | 1 38 | 1 40 | 1 46 | |
| E. by S. | 1 9 | 1 10 | 1 10 | 1 11 | 1 13 | 1 16 | 1 23 | |
| E. S E. | 0 39 | 0 40 | 0 41 | 0 43 | 0 44 | 0 47 | 0 56 | |
| S E. by E. | 0 8 | 0 9 | 0 10 | 0 11 | 0 12 | 0 17 | 0 27 | |
| Southeast. | 0 22 | 0 21 | 0 20 | 0 19 | 0 17 | 0 13 | 0 2 | |
| S E. by S. | 0 52 | 0 51 | 0 50 | 0 49 | 0 47 | 0 44 | 0 33 | |
| S. S E, | 1 20 | 1 19 | 1 19 | 1 18 | 1 16 | 1 13 | 1 3 | |
| S. by E. | 1 46 | 1 46 | 1 45 | 1 44 | 1 43 | 1 41 | 1 33 | |
| South. | 2 6 | 2 6 | 2 6 | 2 5 | 2 4 | 2 3 | 2 57 | |
| S. by W. | 2 23 | 2 23 | 2 23 | 2 22 | 2 22 | 2 21 | 2 18 | |
| S. S W. | 2 34 | 2 34 | 2 34 | 2 34 | 2 33 | 2 33 | 2 32 | |
| S W. by S. | 2 38 | 2 38 | 2 38 | 2 38 | 2 38 | 2 38 | 2 38 | |
| Southwest. | 2 37 | 2 37 | 2 37 | 2 37 | 2 37 | 2 37 | 2 36 | |
| S W. by W. | 2 29 | 2 29 | 2 29 | 2 29 | 2 28 | 2 26 | 2 26 | |
| W. S W. | 2 15 | 2 15 | 2 15 | 2 15 | 2 14 | 2 12 | 2 8 | |
| W. by S. | 1 57 | 1 57 | 1 57 | 2 56 | 1 55 | 1 53 | 1 47 | |
| West. | 1 33 | 1 32 | 1 32 | 1 31 | 1 30 | 1 27 | 1 18 | |
| W. by N. | 1 7 | 0 6 | 1 6 | 1 4 | 1 3 | 1 00 | 0 49 | |
| W. N W. | 0 37 | 0 36 | 0 35 | 0 34 | 0 32 | 0 28 | 0 17 | |
| N W. by W. | 0 6 | 0 5 | 0 4 | 0 2 | 0 1 | 0 00 | 0 6 | |

This former Table ſheweth how much the *North Star* is either above or below the Pole, in any of theſe ſeven Latitudes, ſet down at the top of the Table, the Guards being upon any Point of the Compaſs.

The uſe of which Table is thus, having obſerved the Altitude of the N. Starre, mark as neer as you may or rather obſerve by a Nocturnall made of purpoſe upon what point of the Compaſſe the Guard then is; Next conſider, which of theſe ſeven Latitudes you are neereſt unto, which you may eaſily know by your account of your Ships way. Then reſort to this Table, and finding therein the ſaid point, upon which the Guard was at your obſervation, right againſt the ſame in the Columne of the Latitude you are neareſt unto, is the number of Deg. and Minutes that the Starre is either above or below the Pole, which number ſo found, if it be above the Pole, it muſt be ſubtracted from your Altitude taken, but if it be below the Pole, it muſt be added to the ſaid Altitude taken, which Totall added, or Remainer ſubtracted, is the true height of the Pole,

As for Example.

Obſerving the North Starre to be 58 degrees 30 min. when the Guard is at the N E. neere Latitude 60 deg. 00 min. I looke in the Table for the N E. point of the Compaſſe in Latitude 60 deg. 00 min. and right againſt the ſame I finde 2 deg. 37 min. under the Pole: which being that the North-Starre is under the Pole, I adde his Declination 2 deg. 37 min. to 58 deg. 30 min. his Altitude obſerved, and the Totall is 61 deg. 7 min. the full height of the Pole in that place.

Again,

Again, obserting the North Starre to be 50 deg. 15 min. above the Horizon when the Guard is upon the South-East point of the Compasse, heere Latitude 50 deg. 00 min. I looke for South-East in the Table, and right against the same is 19 minutes, above the Pole, which being that the Starre is then so much higher than the Pole it self, I subtract 19 minutes the Declination of the Star from 50 degrees 15 min, and the remainer is 49 deg. 56 minutes, the perfect height of the Pole above the Horizon, in the said place of observation.

And now hauing made plain unto you the use & profit of the said Table, it being indeed so necessary & commodious for the Mariners use as any rule whatsoever; it resteth now to speak somewhat more particularly of the other fixed Starres, set down in the Tables following, wherein are, in the first page eleven Columns, the first is the number of the Stars, which are 77; the second is their Names, the third is their Magnitudes, either the 1, 2 or 3, Magnitude; the fourth is their Right Ascensions in degrees and hundred parts: the fift is their Difference of their Right Ascensions for 100 years: the first is their Declination in degrees and minutes; the seventh, is the name of their Position, S, signifying South, and N, signifying North: The eighth is their Difference of their Declination for 100 years: The ninth sheweth whether their difference of Declination be to be added or subtracted, A signifieth to adde, and S to subtract. In the 10 and 11 Columnes, and so along over the second Page at the top of the Column, are the names of the 12 Moneths, and under them in the Columns of every Moneth are the Hours and hundred parts of an hour, that any of these Starres come to the Meridian the first day of every Moneth, the letter M. sheweth the houre to be betweene Midnight and Noon, and the letter A sheweth the hour to be betweene Noon and Midnight. Next after the Table of the Stars followes a Table of the Suns Right Ascension in hours and hundred parts, the use of which Tables followes after the Tables.

## The right *Ascension* and *Declination*, of 77 of the principal fixed with the difference of the right Ascension

| N. | Names as 1636. | M | Right Ascension. | Dif. 100 year. | Declination | S | Diff. 100 year. | Janua | Febru |
|---|---|---|---|---|---|---|---|---|---|
| | | | D. Pa | d. pts | D. M. | | M | H. pts | H. pts |
| | | | | | | | | A | A |
| 1 | Mir. in the Whales tail, | 3 | 00 28 | 1 30 | 10 49 | S | 34 S | 4 48 | 2 34 |
| 2 | In Cassiopeias lip, | 3 | 00 53 | 0 00 | 53 34 | N | 1 0 | 4 50 | 2 36 |
| 3 | Souther. of the Crosiers. | 2 | 03 00 | 0 00 | 67 30 | S | 0 0 | 4 70 | 2 56 |
| 4 | South in the Whales tail, | 2 | 06 32 | 1 27 | 20 0 | S | 34 S | 4 88 | 2 74 |
| 5 | The Pole Starre, | 2 | 06 65 | 3 28 | 87 21 | N | 34 A | 4 9[illegible] | 2 76 |
| 6 | M. in Andromedas girdle, | 2 | 12 47 | 1 39 | 33 47 | N | 33 A | 5 29 | 3 15 |
| 7 | The Whales back, | 3 | 12 50 | 0 00 | 12 26 | S | 0 0 | 5 30 | 3 16 |
| 8 | In Cassiopeias knee. | 3 | 15 50 | 0 00 | 58 55 | N | 0 0 | 5 50 | 3 36 |
| 9 | South in the Rams horn, | 3 | 23 44 | 1 36 | 17 29 | N | 31 A | 6 03 | 3 88 |
| 10 | North in the Rams horn, | 3 | 23 60 | 1 44 | 19 6 | N | 27 A | 6 03 | 3 89 |
| 11 | The Rams head, | 3 | 26 50 | 0 00 | 21 42 | N | 0 0 | 6 23 | 4 09 |
| 12 | [illegible] in the Whales iaw | 2 | 40 88 | 1 12 | 3 39 | N | 27 A | 7 18 | 4 04 |
| 13 | The head of Medusa, | 2 | 41 21 | 1 61 | 39 31 | N | 25 A | 7 21 | 5 07 |
| 14 | Perseus right side. | 2 | 44 50 | 0 00 | 48 28 | N | 0 0 | 7 45 | 5 29 |
| 15 | After in Perseus left foot, | 3 | 52 91 | 1 57 | 30 47 | N | 20 A | 7 99 | 7 85 |
| 16 | Last of Andrams, | 1 | 45 00 | 0 00 | 40 00 | S | 10 0 | this is | at the |
| 17 | The Bulls eye | 1 | 63 78 | 1 45 | 15 48 | N | 16 A | 8 71 | 6 57 |
| 18 | The Goat Hircus, | 1 | 72 47 | 1 85 | 45 35 | N | 10 A | 9 29 | 7 15 |
| 19 | Orions left foot. | 1 | 74 13 | 1 40 | 8 40 | S | 9 S | 9 40 | 7 26 |
| 20 | Orions left shoulder; | 2 | 76 44 | 1 35 | 5 59 | N | 7 A | 9 55 | 7 41 |
| 21 | Fixt in Orions girdle, | 2 | 78 00 | 0 00 | 0 38 | S | 0 0 | 9 66 | 7 52 |
| 22 | Orions right shoulder, | 2 | 82 91 | 1 37 | 7 17 | N | 3 A | 10 05 | 7 91 |
| 23 | The Wagons right shoulder, | 2 | 88 25 | 0 00 | 41 50 | N | 0 0 | 10 35 | 8 21 |
| 24 | Brightest in Pollux feet. | 2 | 94 17 | 1 47 | 16 40 | N | 3 S | 10 74 | 8 60 |
| 25 | Cannopus, | 1 | 95 00 | 0 00 | 51 50 | S | 0 0 | 10 80 | 8 66 |
| 26 | The great Dog. | 1 | 97 30 | 1 14 | 16 13 | S | 5 A | 10 94 | 8 80 |
| 27 | 1. Head Gemini Castor, | 2 | 107 84 | 1 64 | 32 37 | N | 11 S | 11 65 | 9 51 |
| 28 | The little Dog, | 1 | 110 10 | 1 35 | 6 8 | N | 12 S | 11 80 | 9 |

Stars, and their coming to South the first Day of every Moneth; and Declination of 51 of them for 100 Years.

| Marc. | Apri. | May. | June. | July. | Augg. | Septé. | Octo. | Nové. | Decé | |
|---|---|---|---|---|---|---|---|---|---|---|
| H. pts | H. pts | H. p's | H. pts | H pts | H. prs | H. pts | H. pts | H. pts | H. pts | N. |
| A | M | M | M | M | M | M | A | A | A | |
| 0 57 | 10 69 | 8 81 | 6 72 | 4 65 | 2 62 | 0 72 | 10 91 | 8 92 | 6 78 | 1 |
| 0 59 | 10 71 | 8 83 | 6 74 | 4 67 | 2 64 | 0 74 | 10 93 | 8 94 | 6 80 | 2 |
| 0 79 | 10 91 | 9 03 | 6 [illegible] | 4 87 | 2 84 | 0 94 | 11 13 | 9 14 | 7 00 | 3 |
| 0 97 | 11 09 | 9 21 | 7 12 | 5 05 | 3 02 | 1 12 | 11 31 | 9 32 | 7 18 | 4 |
| 0 99 | 11 11 | 9 23 | 7 14 | 5 07 | 3 04 | 1 14 | 11 33 | 9 34 | 7 20 | 5 |
| 1 38 | 11 50 | 9 62 | 7 53 | 5 46 | 3 43 | 1 53 | 11 72 | 9 73 | 7 59 | 6 |
| 1 39 | 11 51 | 9 63 | 7 54 | 5 47 | 3 44 | 1 54 | 11 73 | 9 74 | 7 60 | 7 |
| 1 59 | 11 71 | 9 83 | 7 74 | 5 67 | 3 64 | 1 74 | 11 93 | 9 97 | 7 80 | 8 |
| | A | | | | | | M | | | |
| 2 11 | 0 23 | 10 35 | 8 26 | 6 19 | 4 16 | 2 26 | 0 45 | 10 46 | 8 32 | 9 |
| 2 12 | 0 24 | 10 36 | 8 27 | 6 20 | 4 17 | 2 27 | 0 46 | 10 47 | 8 33 | 10 |
| 2 32 | 0 44 | 10 56 | 8 47 | 6 40 | 4 37 | 2 47 | 0 66 | 10 67 | 8 53 | 11 |
| 3 27 | 1 39 | 11 51 | 9 42 | 7 35 | 5 32 | 3 42 | 1 61 | 11 62 | 9 48 | 12 |
| 3 30 | 1 42 | 11 54 | 9 45 | 7 38 | 5 35 | 3 45 | 1 64 | 11 65 | 9 51 | 13 |
| 3 52 | 1 64 | 11 76 | 9 67 | 7 60 | 5 57 | 3 67 | 1 86 | 11 87 | 9 73 | 14 |
| | | A | | | | | | M | | |
| 4 08 | 2 20 | 00 32 | 10 23 | 8 16 | 6 13 | 4 23 | 2 42 | 0 43 | 10 29 | 15 |
| same | Time | with | perseu | right | side. | | | | | 16 |
| 4 80 | 2 92 | 1 04 | 10 95 | 8 88 | 6 85 | 4 95 | 3 14 | 1 15 | 11 01 | 17 |
| 5 38 | 3 50 | 1 62 | 11 53 | 9 46 | 7 43 | 5 53 | 3 72 | 1 73 | 11 59 | 18 |
| 5 49 | 3 61 | 1 73 | 11 [illegible] | 9 57 | 7 54 | 5 64 | 3 83 | 1 84 | 11 70 | 19 |
| 5 64 | 3 76 | 1 88 | 11 79 | 9 72 | 7 69 | 5 79 | 3 98 | 1 99 | 11 85 | 20 |
| 5 75 | 3 87 | 1 99 | 11 90 | 9 83 | 7 80 | 5 9[illegible] | 4 09 | 2 10 | 11 96 | 21 |
| | | | A | | | | | | M | |
| 6 14 | 4 26 | 2 38 | 0 29 | 10 22 | 8 19 | 6 29 | 4 48 | 2 49 | 0 35 | 22 |
| 6 44 | 4 56 | 2 68 | 0 59 | 10 52 | 8 49 | 6 59 | 4 78 | 2 79 | 0 65 | 23 |
| 6 83 | 4 95 | 3 07 | 0 98 | 10 98 | 8 88 | 6 98 | 5 17 | 3 18 | 1 04 | 24 |
| 6 89 | 5 01 | 3 13 | 1 04 | 10 97 | 8 94 | 7 04 | 5 23 | 3 24 | 1 10 | 25 |
| 7 03 | 5 15 | 3 27 | 1 18 | 11 11 | 9 8 | 7 18 | 5 37 | 3 38 | 1 24 | 26 |
| 7 74 | 5 86 | 3 98 | 1 89 | 11 82 | 9 79 | 7 89 | 6 08 | 4 09 | 1 95 | 27 |
| 7 89 | 6 01 | 4 13 | 2 04 | 11 97 | 9 94 | 8 4 | 6 23 | 4 42 | 2 10 | 28 |

## The right *Ascension* and *Declination*, of 77 of the principal fixed with the difference of the right Ascension

| N | Names 1636. | M | Right Ascen-tion. | Dif. 100 year. | Decli-nation | S N | Diff 100 year | | Janua | Febru |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | D. Pa | d. pts | D. M. | | M | | H. pts | H. pts |
| 29 | 2d. Head, Gemini, Pollux, | 2 | 110 77 | 1 59 | 8 51 | N | 125 | | 11 84 M | 9 70 |
| 30 | Mid. Angle, S. Triangle, | 2 | 121 00 | 0 00 | 62 35 | S | 000 | | 0 53 | 10 39 |
| 31 | Souther. At the Crab, | 3 | 129 63 | 1 39 | 13 1 | N | 22 | S | 1 10 | 10 96 |
| 32 | Souther, South Triangle | 3 | 135 00 | 0 00 | 78 30 | S | 00 | P | 1 46 | 10 42 |
| 33 | Procyons heart, | 1 | 137 46 | 1 25 | 7 5 | S | 62 | A | 1 62 | 11 48 M |
| 34 | Lyons Neck, | 2 | 146 50 | 0 00 | 21 52 | N | 00 | 0 | 2 22 | 0 08 |
| 35 | Lyons Heart, | 1 | 147 25 | 1 37 | 13 42 | N | 29 | S | 2 27 | 0 13 |
| 36 | Great Bears side, | 2 | 159 75 | 0 00 | 58 19 | N | 00 | 0 | 3 11 | 0 97 |
| 37 | Great Bears back. | 2 | 160 22 | 1 67 | 63 43 | N | 33 | S | 3 14 | 1 00 |
| 38 | Lyons Back, | 2 | 163 50 | 0 00 | 22 33 | N | 00 | 0 | 3 38 | 1 22 |
| 39 | Dragons Taile, | 3 | 167 00 | 0 00 | 71 34 | N | 00 | 0 | 3 60 | 1 46 |
| 40 | Lyons Taile. | 1 | 172 51 | 1 33 | 16 37 | N | 34 | S | 3 97 | 1 83 |
| 41 | Great Bears thigh, | 2 | 173 50 | 0 00 | 55 47 | N | 00 | 0 | 4 03 | 1 89 |
| 42 | Centaurus thigh, | 2 | 178 50 | 0 00 | 49 30 | S | 00 | 0 | 4 36 | 2 22 |
| 43 | First in the Ravens wing, | 3 | 179 63 | 1 03 | 15 29 | S | 34 | A | 4 43 | 2 29 |
| 44 | 1. In the great Bears taile | 2 | 189 42 | 1 15 | 57 59 | N | 34 | S | 5 09 | 3 95 |
| 45 | Virgins Spike, | 1 | 196 50 | 1 32 | 9 12 | S | 33 | A | 5 56 | 3 42 |
| 46 | 2 In the great Bears taile, | 2 | 197 28 | 1 04 | 56 52 | N | 33 | S | 5 61 | 3 47 |
| 47 | 3. In the great Bears tail, | 2 | 203 27 | 1 63 | 51 11 | N | 30 | S | 6 01 | 3 87 |
| 48 | Centaurus right shoulder, | 3 | 206 36 | 1 48 | 35 8 | S | 30 | A | 6 22 | 4 08 |
| 49 | Arcturus, | 1 | 209 81 | 1 20 | 21 8 | N | 30 | S | 6 45 | 4 31 |
| 50 | South Ballance, | 2 | 217 74 | 1 39 | 14 27 | S | 27 | A | 6 97 | 4 83 |
| 51 | Centaurus foot, | 2 | 221 00 | 0 00 | 60 6 | S | 00 | 0 | 7 20 | 5 06 |
| 52 | Fixemost Guard, | 2 | 222 91 | 0 19 | 75 44 | N | 25 | S | 7 32 | 5 15 |
| 53 | South Ballance, | 2 | 223 75 | 0 00 | 7 57 | S | 00 | 0 | 7 37 | 5 23 |
| 54 | Brightest South crown, | 2 | 229 83 | 1 07 | 27 58 | N | 22 | S | 7 78 | 5 64 |

Stars, and their coming to South the first Day of every Moneth, and Declination of 51 of them for 100 Years.

| Marc. | April. | May. | June. | July. | Augu. | Septé. | Octo. | Nové. | Decé. | N |
|---|---|---|---|---|---|---|---|---|---|---|
| H. pts | H. pts | H.pts | H.pts | H pts | H. pts | H. pts | H.pts | H. pts | H. pts | |
| A | A | A | A | A | M | M | M | M | M | |
| 7 93 | 6 05 | 4 17 | 2 08 | 0 01 | 9 98 | 8 08 | 6 27 | 4 28 | 2 14 | 29 |
| 8 62 | 6 74 | 4 86 | 2 77 | 0 70 | 10 67 | 8 77 | 6 96 | 4 97 | 2 83 | 30 |
| 9 19 | 7 31 | 5 43 | 3 34 | 1 27 | 11 24 | 9 34 | 7 53 | 5 54 | 3 40 | 31 |
| 9 55 | 7 67 | 5 79 | 3 70 | 1 63 | 11 60 | 9 70 | 7 89 | 5 90 | 3 76 | 32 |
| 9 71 | 7 83 | 5 95 | 3 86 | 1 79 | 11 76 | 9 86 | 8 05 | 6 06 | 3 92 | 33 |
| | | | | | A | | | | | |
| 10 31 | 8 43 | 6 55 | 4 46 | 2 39 | 0 36 | 10 46 | 8 65 | 6 66 | 4 52 | 34 |
| 10 36 | 8 48 | 6 60 | 4 51 | 2 44 | 0 41 | 10 51 | 8 70 | 6 71 | 4 57 | 35 |
| 11 20 | 9 32 | 7 44 | 5 35 | 3 28 | 1 25 | 11 35 | 9 54 | 7 55 | 5 41 | 36 |
| 11 23 | 9 35 | 7 47 | 5 38 | 3 31 | 1 28 | 11 38 | 9 57 | 7 58 | 5 44 | 37 |
| 11 45 | 9 57 | 7 69 | 5 60 | 3 53 | 1 50 | 11 60 | 9 79 | 7 80 | 5 66 | 38 |
| 11 69 | 9 81 | 7 93 | 5 84 | 3 77 | 1 74 | 11 84 | 10 03 | 8 04 | 5 90 | 39 |
| M | | | | | | A | | | | |
| 0 06 | 10 18 | 8 30 | 6 21 | 4 14 | 2 11 | 0 21 | 10 40 | 8 41 | 6 27 | 40 |
| 0 12 | 10 24 | 8 36 | 6 27 | 4 20 | 2 17 | 0 27 | 10 46 | 8 47 | 6 33 | 41 |
| 0 45 | 10 57 | 8 69 | 6 60 | 4 53 | 2 50 | 0 60 | 10 79 | 8 80 | 6 66 | 42 |
| 0 52 | 10 64 | 8 76 | 6 67 | 4 60 | 2 57 | 0 67 | 10 86 | 8 87 | 6 73 | 43 |
| 1 18 | 11 30 | 9 42 | 7 33 | 5 26 | 3 23 | 1 33 | 11 52 | 9 53 | 7 39 | 44 |
| 1 65 | 11 77 | 9 89 | 7 80 | 5 73 | 3 70 | 1 80 | 11 99 | 10 00 | 7 86 | 45 |
| | | | | | | | A | | | |
| 1 70 | 11 82 | 9 94 | 7 85 | 5 78 | 3 75 | 1 85 | 0 04 | 10 05 | 7 91 | 46 |
| | M | | | | | | | | | |
| 2 10 | 0 22 | 10 34 | 8 25 | 6 18 | 4 15 | 2 25 | 0 44 | 10 45 | 8 31 | 47 |
| 2 31 | 0 43 | 10 55 | 8 46 | 6 39 | 4 36 | 2 46 | 0 65 | 10 66 | 8 51 | 48 |
| 2 54 | 0 66 | 10 78 | 8 69 | 6 62 | 4 59 | 2 69 | 0 88 | 10 89 | 8 75 | 49 |
| 3 06 | 1 18 | 11 30 | 9 21 | 7 14 | 5 11 | 3 21 | 1 40 | 11 41 | 9 27 | 50 |
| 3 29 | 1 41 | 11 53 | 9 44 | 7 37 | 5 34 | 3 44 | 1 63 | 11 64 | 9 50 | 51 |
| 3 41 | 1 53 | 11 65 | 9 56 | 7 49 | 5 46 | 3 56 | 1 75 | 11 76 | 9 62 | 52 |
| 3 46 | 1 58 | 11 70 | 9 61 | 7 54 | 5 51 | 3 61 | 1 80 | 11 81 | 9 67 | 53 |
| | | M | | | | | | A | | |
| 3 87 | 1 99 | 00 11 | 10 2 | 7 95 | 5 92 | 4 02 | 2 21 | 0 22 | 10 08 | 54 |

## The right *Ascension* and *Declination*, of 77 of the principal fix
## with the difference of their right Ascen

| N | Names, 1636. | M | Right Ascen-tion. | Dif. 100 year. | Decli-nation | S or N | Diff. 100 year. | Janu: | Fe |
|---|---|---|---|---|---|---|---|---|---|
| | | | D. Par. | M. pr. | D. M. | | M | H p. | H. |
| | | | | | | | | M | A |
| 55 | Brightest of Serpents neck | 2 | 231 68 | 1 23 | 7 53 | N | 21 S | 7 9 | 5 7 |
| 56 | Hindermost Ellard | 2 | 231 25 | 0 00 | 73 23 | N | 0 0 | 7 88 | 5 7 |
| 57 | The Scorpions heart | 1 | 341 30 | 1 53 | 25 32 | S | 16 A | 8 58 | 6 4 |
| 58 | Serpentarius right knee | 3 | 252 42 | 1 46 | 15 11 | S | 10 A | 9 29 | 7 1 |
| 59 | Herrules head | 3 | 254 50 | 0 00 | 14 53 | N | 0 0 | 9 43 | 7 2 |
| 60 | Sagitarius arrow head | 3 | 265 81 | 1 62 | 29 68 | S | 2 A | 10 18 | 8 0 |
| 61 | The Dragons head | 3 | 267 07 | 0 38 | 51 37 | N | 2 A | 10 26 | 8 1 |
| 62 | The Harp | 1 | 276 15 | 0 85 | 38 29 | N | 4 A | 10 87 | 8 7 |
| 63 | Sagitarius knee | 2 | 281 00 | 0 00 | 74 42 | S | 0 0 | 11 20 | 9 0 |
| 64 | The Swans mouth | 3 | 289 01 | 1 03 | 27 18 | N | 12 A | 11 73 | 9 59 |
| 65 | Sagitarius left thigh | 3 | 293 09 | 1 67 | 35 30 | S | 14 S | 11 00 | 9 86 |
| | | | | | | | | A | |
| 66 | The Vultures heart Alkair | 3 | 293 26 | 1 22 | 7 58 | N | 4 A | 0 01 | 9 87 |
| 67 | The Dolphins tail | 3 | 304 00 | 0 00 | 27 10 | N | 0 0 | 0 73 | 10 59 |
| 68 | The Swans tail | 2 | 307 27 | 1 08 | 44 01 | N | 20 A | 0 94 | 10 80 |
| 69 | The Dolphins head | 3 | 307 46 | 1 19 | 14 52 | N | 21 A | 0 96 | 10 82 |
| 70 | Cepheus right shoulder | 3 | 317 50 | 0 00 | 61 00 | N | 0 0 | 1 63 | 11 49 |
| 71 | Pegasus mouth | 3 | 321 62 | 1 24 | 8 14 | N | 26 A | 1 90 | 11 76 |
| 72 | In the tail Capricorn | 3 | 321 75 | 0 00 | 17 51 | S | 0 0 | 1 91 | 11 77 |
| | | | | | | | | | A |
| 73 | Fomahant | 1 | 339 38 | 1 31 | 31 27 | S | 32 S | 3 08 | 0 94 |
| 74 | Pegasus right shoulder | 2 | 341 57 | 1 22 | 26 07 | N | 32 A | 3 23 | 1 09 |
| 75 | Pegasus wing | 2 | 341 68 | 1 26 | 13 17 | N | 32 A | 3 24 | 1 40 |
| 76 | Head of Andromeda | 2 | 357 43 | 1 29 | 27 06 | N | 31 A | 4 29 | 2 15 |
| 77 | Brightest Cassiopeiaes | 3 | 357 52 | 1 27 | 57 10 | N | 33 A | 4 29 | 2 15 |

(Chair

Stars, and their coming to South the first day of every Month and Declination of 51 of them for 100 Years.

| Marc. | April | May. | June. | July. | Aug. | Sept. | Octo. | Nové. | Decé | N |
|---|---|---|---|---|---|---|---|---|---|---|
| H.pts | H.pts | H.pts | H.pts | H.pts | H.pts | H pts | H.pts | H.pts | H.pts | |
| M | M | M | A | A | A | A | A | A | M | |
| 4 00 | 2 12 | 0 24 | 10 15 | 8 08 | 6 05 | 4 15 | 2 34 | 0 35 | 10 21 | 55 |
| 4 01 | 2 13 | 0 25 | 10 16 | 8 09 | 6 06 | 4 16 | 2 35 | 0 36 | 10 22 | 56 |
| 4 67 | 2 79 | 0 91 | 10 82 | 8 75 | 6 72 | 4 82 | 3 01 | 1 02 | 10 88 | 57 |
| 5 38 | 3 50 | 1 62 | 11 53 | 9 46 | 7 44 | 5 54 | 3 72 | 1 73 | 11 59 | 58 |
| 5 52 | 3 64 | 1 76 | 11 67 | 9 60 | 7 58 | 5 68 | 3 86 | 1 87 | 11 73 | 59 |
| | | | M | | | | | | A | |
| 6 27 | 4 39 | 2 51 | 0 42 | 10 35 | 8 32 | 6 42 | 4 62 | 2 62 | 0 48 | 60 |
| 6 35 | 4 47 | 2 59 | 0 50 | 10 43 | 8 40 | 6 50 | 4 69 | 2 70 | 0 56 | 61 |
| 6 96 | 5 08 | 3 20 | 1 11 | 11 04 | 9 01 | 7 11 | 5 30 | 3 31 | 1 17 | 62 |
| 7 29 | 5 41 | 3 53 | 1 44 | 11 37 | 9 34 | 7 44 | 5 63 | 3 64 | 1 50 | 63 |
| 7 82 | 5 94 | 4 06 | 1 97 | 11 90 | 9 87 | 7 97 | 6 16 | 4 17 | 2 03 | 64 |
| | | | | M | | | | | | |
| 8 09 | 6 21 | 4 33 | 2 24 | 0 17 | 10 14 | 8 24 | 6 43 | 4 44 | 2 30 | 65 |
| 8 10 | 6 22 | 4 34 | 2 25 | 0 18 | 10 15 | 8 25 | 6 44 | 2 45 | 2 31 | 66 |
| 8 82 | 6 94 | 5 06 | 2 97 | 0 90 | 10 87 | 8 97 | 7 16 | 5 17 | 3 03 | 67 |
| 9 03 | 7 15 | 5 27 | 3 18 | 1 11 | 11 08 | 9 18 | 7 37 | 5 38 | 3 24 | 68 |
| 9 05 | 7 17 | 5 29 | 3 20 | 1 13 | 11 10 | 9 20 | 7 39 | 5 40 | 3 26 | 69 |
| 9 72 | 7 84 | 5 96 | 3 87 | 1 80 | 11 77 | 9 87 | 8 06 | 6 07 | 3 93 | 70 |
| | | | | | M | | | | | |
| 9 99 | 8 11 | 6 23 | 4 14 | 2 07 | 0 04 | 10 14 | 8 33 | 6 34 | 4 20 | 71 |
| 10 00 | 8 12 | 6 24 | 4 15 | 2 08 | 0 05 | 10 15 | 8 34 | 6 35 | 4 21 | 72 |
| 11 17 | 9 29 | 7 41 | 5 32 | 3 25 | 1 22 | 11 32 | 9 51 | 7 52 | 5 38 | 73 |
| 11 32 | 9 44 | 7 56 | 5 47 | 3 40 | 1 37 | 11 47 | 9 66 | 7 67 | 5 53 | 74 |
| 11 33 | 9 45 | 7 57 | 5 48 | 3 41 | 1 38 | 11 48 | 9 67 | 7 68 | 5 54 | 75 |
| A | | | | | | M | | | | |
| 0 38 | 10 50 | 8 62 | 6 53 | 4 46 | 2 43 | 00 53 | 10 72 | 8 73 | 6 59 | 76 |
| 0 38 | 10 50 | 8 62 | 6 53 | 4 46 | 2 43 | 00 53 | 10 72 | 8 73 | 6 59 | 77 |

## A Table of the right Aſcenſion of the Sunne every day at Noon, in Hours and hundred parts.

| Dayes. | January H. parts. | Febru. H. pts. | March H. pts. | Aprill. H. pts. | May. H. pts. | June. H. pts. |
|---|---|---|---|---|---|---|
| 1. | 19 54 | 21 68 | 23 45 | 1 33 | 3 21 | 5 30 |
| 2 | 61 | 75 | 51 | 33 | 28 | 37 |
| 3 | 68 | 81 | 57 | 45 | 34 | 44 |
| 4 | 76 | 88 | 63 | 51 | 41 | 51 |
| 5 | 83 | 94 | 69 | 57 | 47 | 57 |
| 6 | 90 | 22 01 | 75 | 63 | 54 | 64 |
| 7 | 97 | 07 | 81 | 69 | 61 | 71 |
| 8 | 20 04 | 23 | 87 | 76 | 67 | 78 |
| 9 | 11 | 20 | 93 | 82 | 74 | 85 |
| 10 | 18 | 26 | 24 00 | 88 | 80 | 92 |
| 11 | 25 | 33 | 06 | 94 | 87 | 99 |
| 12 | 33 | 39 | 12 | 2 00 | 94 | 6 06 |
| 13 | 40 | 45 | 18 | 07 | 4 00 | 13 |
| 14 | 47 | 52 | 24 | 13 | 07 | 20 |
| 15 | 53 | 58 | 30 | 19 | 14 | 27 |
| 16 | 60 | 64 | 36 | 25 | 21 | 34 |
| 17 | 67 | 71 | 42 | 32 | 27 | 41 |
| 18 | 74 | 77 | 48 | 38 | 34 | 47 |
| 19 | 81 | 83 | 54 | 44 | 41 | 54 |
| 20 | 88 | 89 | 60 | 51 | 48 | 61 |
| 21 | 95 | 96 | 66 | 57 | 54 | 68 |
| 22 | 21 01 | 23 02 | 72 | 63 | 61 | 75 |
| 23 | 08 | 08 | 78 | 70 | 68 | 82 |
| 24 | 15 | 14 | 84 | 76 | 75 | 89 |
| 25 | 22 | 20 | 90 | 82 | 82 | 96 |
| 26 | 28 | 26 | 96 | 89 | 89 | 7 02 |
| 27 | 35 | 32 | 01 02 | 95 | 95 | 09 |
| 28 | 42 | 39 | 08 | 3 02 | 5 02 | 16 |
| 29 | 48 | | 14 | 08 | 09 | 23 |
| 30 | 55 | | 20 | 15 | 19 | 30 |
| 31 | 61 | | 27 | | 23 | |

## A Table of the right Ascension of the Sun every day at Noon, in Hours and hundred parts.

| Dayes. | July. H. pts. | Augu. H. pts. | Septē. H. pts. | Octob. H. pts. | Noveb. H. pts. | Dec.ē H. pts. |
|---|---|---|---|---|---|---|
| 1 | 7 37 | 40 | 11 30 | 13 11 | 15 10 | 17 24 |
| 2 | 43 | 46 | 36 | 17 | 17 | 31 |
| 3 | 50 | 52 | 42 | 23 | 24 | 38 |
| 4 | 57 | 59 | 48 | 29 | 31 | 46 |
| 5 | 64 | 65 | 54 | 35 | 38 | 53 |
| 6 | 70 | 71 | 60 | 42 | 45 | 61 |
| 7 | 77 | 78 | 66 | 48 | 51 | 68 |
| 8 | 84 | 84 | 71 | 54 | 58 | 75 |
| 9 | 90 | 90 | 77 | 60 | 65 | 83 |
| 10 | 97 | 96 | 83 | 67 | 72 | 90 |
| 11 | 8 04 | 10 02 | 89 | 73 | 79 | 98 |
| 12 | 10 | 08 | 95 | 80 | 86 | 18 05 |
| 13 | 17 | 15 | 12 01 | 86 | 93 | 13 |
| 14 | 24 | 21 | 07 | 92 | 16 01 | 20 |
| 15 | 30 | 27 | 13 | 98 | 08 | 27 |
| 16 | 37 | 33 | 19 | 14 05 | 11 | 35 |
| 17 | 43 | 39 | 25 | 11 | 22 | 42 |
| 18 | 50 | 45 | 31 | 18 | 29 | 50 |
| 19 | 57 | 51 | 38 | 24 | 36 | 57 |
| 20 | 63 | 57 | 44 | 31 | 43 | 64 |
| 21 | 69 | 63 | 50 | 37 | 51 | 72 |
| 22 | 76 | 69 | 56 | 42 | 58 | 79 |
| 23 | 82 | 75 | 62 | 50 | 65 | 87 |
| 24 | 89 | 81 | 68 | 57 | 72 | 94 |
| 25 | 94 | 88 | 74 | 63 | 80 | 19 01 |
| 26 | 9 02 | 94 | 80 | 70 | 87 | 09 |
| 27 | 08 | 11 00 | 86 | 77 | 94 | 16 |
| 28 | 15 | 06 | 92 | 83 | 17 02 | 23 |
| 29 | 21 | 12 | 98 | 90 | 09 | 30 |
| 30 | 27 | 18 | 13 04 | 97 | 16 | 38 |
| 31 | 34 | 24 | | 15 04 | | 45 |

## A Deſcription of the former Table of the Sunnes Right Aſcenſion.

I Think it not amiſſe, before I ſhew the uſe of the former Table of right Aſcenſion, for the finding of the time of any Starre comming to the Meridian to explain unto you what we call Right Aſcenſion.

Know therefore, that in the Sphear there is right Aſcenſion, oblique Aſcenſion, and mean Aſcenſion, which have all ſeverall deſinitions: but the reſt being impertinent, I will onely ſpeak of Right Aſcenſion which is thus deſined: Right Aſcenſion is that portion of the Equinoctiall which commeth to the Meridian of Non-ſtead with any Star, or any part of the Ecliptick: or more plainly, it is that number of degrees of the Equinoctiall comprized betwixt the Vernall Equinoctiall point, or interſection of the ſaid Equinoctiall circle, and the firſt min. of Aries, and the Star or part of the Ecliptique, which is upon the Meridian at the day or time deſired. As for your better underſtanding, if the beginning of Aries be upon the Meridian, or any point or Star in the ſaid beginning of Aries, then hath the ſaid point or Star ſo ſituated, no right Aſcenſion at all, by reaſon that the beginning of the Equinoctial commeth to the Meridian therewith: But if the beginning of Cancer, or any Star in that ſituation be upon the Meridian, then is there with it under the ſame Meridian 90 degrees of the Equinoctiall, or 6 hours of time, being that every 15 degrees of the Equinoctiall anſwers to one hour of time, ſhewing that the Star or point which is in the beginning of Aries ſhall come to the Meridian 6 hours ſooner than that other which is in the beginning of Cancer, and ſo others: I doubt not but that theſe few words will ſuffice to give you the better light to that which follows. Firſt, therefore, to finde the right Aſcenſion of the Sunne at any time look for the Moneth in the head of the Table, and for the day of the moneth, at the left ſide of that face, where the Moneth deſired is, and in the common Angle anſwering to them both: is the hour and minute of the Suns right aſcenſion.

## The use of the former Tables of the fixed Starres, and of the Suns Right Ascension.

BEfore we come to the use of these Tables, we will answer an Objection that may be made, what the cause is, that all the Stars have not the difference of their right Ascension and Declination alwell as 51 of them: I answer, because those 51 were calculated before-hand for my own use for the year 1636, and since the Book came to my hand to peruse, I have not had time to doe it, yet in regard those 26 Starres that are not so calculated, have been in the Book ever since the first Impression, I doubt not but many Sea-men have taken notice of them to know them for their use, and therefore it were a great injury to them that have them out: But besides, it were a greater injury to the Author of the Book (deceased) utterly to cashiere any thing that he formerly published.

To finde the time of any Starres comming to the Meridian the first day of every Moneth, seek the number of the Starre in the first Column of the left hand Page, and seek the same number in the last Column of the right hand Page, and in the same line under the name of the Moneth you shall see the Hour and hundreth part that the Starre comes to the Meridian at.

### Example.

I desire to know at what time the Buls-eye comes to the Meridian the first of January, I look in the first Column of the left hand Page, and I finde his number 17, then I look 17 in the last Columns of the right hand Page, and right under January in the same line, I finde 8 hours and 71 hundred parts, and because I finde the letter A, next over head, I see it is afternoon, that is 8 of the clock at night, and 71 hundred parts, which is neer three quarters of an hour, and so of all other.

But if I desire to know the time of this Stars comming to the Meridian the 21 of January, first I look in the Table of the Suns

right

right Aſcention, and I finde the Sunnes right Aſcention, to be the firſt of January, 19 houres and 54 parts, and the 21 of Ianuary, I finde it to be [illegible]houres and 95 parts, the difference is 1 houre 41 parts, which I ſubtract from 8 houres 71 parts, the time of the Starres comming to the Meridian the firſt of Ianuary, and the remainer is 7 a clock and 30 parts, that is moze then one quarter of an houre, the time of the Starres comming to the Meridian the 21 of January, and the like of all other.

But if the difference of the Sunnes right Aſcention, betweene the firſt day of the Moneth and the day you deſire, know the time of the Starres comming to the Meridian, be moze then the time of the Stars comming to the Meridian, the firſt day of the Moneth, you muſt adde 12 houres to it. As if I would know what time the Vultures-heart comes to the Meridian the 16 of July, the firſt of July, it comes to the Meridian 6 houres 18 parts of an hour after midnight the Sunnes right Aſcention the firſt of July, is 7 houres 37 parts the 16 of July, it is 8 houres 37 parts the difference is one houre, which I ſubtract from 12 houres and 18 parts, the remainer is 11 houres 18 parts at night, the times of the Starres comming to the Meridian the 16 of July, and the like of all other.

Again, here you may ſee by the Tables, what number of theſe Starres are in rule foz obſervation at any time.

Example.

I deſire to know how many of theſe Stars are in rule foz obſervation the firſt of January, I looke in the Table, and I finde the fourth Starre that is the Southermoſt in the Whales-tayle, to come to the Meridian at 4 a clock and 88 parts Afternoon, that is neer 5 of the clock: and ſo I follow on under the Moneth of Ianuary, untill I come to 6 a clock 1 part in the Morning, that is the 47 Starre, which is the third in the great Bears-taile, betweene which and the fourth Starre are 44 Starres that are in rule foz obſervation the firſt of Ianuary.

To rectifie the right Aſcention of any of thoſe Starres, whoſe difference is given, to any time within 100 years.

I Deſire to know the right Aſcention of Orions right ſhoulder in the year 1686. Subtract 1636 out of 1686, the difference is

50.

50. Then say, if 100 years give one degr. 37 parts, the difference between 1636 and 1686. What shall 50 years give, and you shall finde 0 degr. 68 parts, which added to 83 degr. 91 parts, the right Ascention of the said Starre in the year 1636, the summe is 84 degr. 59 parts, the right Ascention of the same Starre in the year 1686, and the like of all other.

To rectifie the Declination of any of these Starres that have the difference given to any time within 100 yeares.

Example.

I Desire to know the Declination of the Pole-Starre for the yeare 1667. I substract 1636 out of 1667 the difference is 31. Then say, if 100 years give 34 minutes, the difference of Declination (as you may see in the Table) between 1663 and 1636 what shall 31 years give? and you shall finde 10 minutes and 54 parts, that is 10 minutes and $\frac{1}{2}$ which is to be added, as you may see by the Letter A. in the last Column, to 87 deg. 21 min. the Declination of the Pole-Starre for the year 1636, and the whole is 87 deg. 31 $\frac{1}{2}$ minutes, the Declination of the Pole-Starre for the year 1667. This way of rectifying the right Ascention and Declination. I doubt not but it shall meet with some captious Censures, but I know the defect betweén this and Calculation cannot be so palpable as theirs in censuring: howbeit, in the mean time we may see that the former Tables for the North Starre that I have calculated, must be renewed again, at most in 30 years, or else errours will be in their use.

HAving sufficiently explained unto you the manner and way how both by the Sun and Stars to attaine to the true height of the Pole, or Latitude of any place: I purpose now (God willing) to speak somewhat of the Longitude: which as the former is most easie, and the finding thereof known almost to all Sea-men, so is the other as uncertaine, and hath not yet hitherto been found out, or known exactly to any, albeit that many Learned men and of great experience have laboured very earnestly for the same, and many good means have they invented, as helps and assistance unto Mariners in their long Navigations and Travels, by which though

though with great labour care and industry they transport themselves to the utmost Regions of the world: with far more ease and facility they might doe it, if they could as perfectly, and readily finde the Longitude at all times, as they may the Latitude, for then having sayled many dayes in unknown parts upon the large and spacious Seas, and enduring all those un-endurable troubles, miseries and unspeakable calamities, which doe for the most part attend upon long Voyages,: yet after all this if upon the first fair opportunity, they could readily with the Latitude, finde also the Longitude, their fore-passed troubles would be joyfully remedied, being that these two (like loving sisters) would apply such pleasing comfort to their cold stomacks, after their tedious travels, by giving them the true prick or place of their then present being, Peter Apian and Gemma Frisius, hath written thereof, as also some others: but truly in my opinion, it was never brought to so exquisite perfection, as is now a dayes: and for me to write thereof, were but as it were to set up a Candle at noon dayes, rather to shew mine own folly, then to lighten those that know a better way then my selfe: in which doing, well may Apelles saying, Ne Sutor ultra crepidam, be applyed unto me, but for my excuse, I doe intreat the judicious to perswade themselves that it is far from my thought to set down any thing in this for a president unto them, but only in good will to shew my opinion thereof to the Ignorant, being as followeth.

First, therefore, the Latitude being known: by finding the Longitude also, you have the true prick or place in the Globe, or Card where your Ship is, which to finde the neerest, is two wayes, one by dead Reckoning, the other by Observation: but dead reckoning (as they call it) being as I take it most used, I will speak first thereof, by which if it were possible that this Reckoning could exactly and precisely be kept, it would give both Latitude and Longitude without any Observation at all: The different Latitude being only the Distance that the Ship is departed from the Paraliel where she last was, either Northward or Southward: and Longit. being the distance that she is departed from the Meridian, either Eastward or Westward: For the knowledge whereof, these things are principally to be considered.

First,

Firſt, the true pick or place of the Ships being at the begin-ning of the voyage.

Secondly, a ſound and experimented judgement of the way that the Ship maketh with every ſhift of wind.

Thirdly, to know exactly how much the Compaſſe doth vary from the true North or South point, upon the which the Needle is toucht, either Eaſtward or Weſtward, in as many ſeverall places, as conveniently may be obſerved.

Fourthly, to note diligently the Fleods or Currents, which may cauſe the Ships way to be more Leeward or otherwiſe than expectation, and to give allowance of her courſe and way accor-dingly.

Fiftly, the ſeverall points of the Compaſſe that ſhee makes her courſe good upon, and what way ſhe hath made upon every point.

Sirtly, to bring thoſe ſeverall Courſes into one ſtreight line, thereby to know what Courſe ſhe hath made good with the neereſt diſtance upon the ſaid Point or Romb, that ſhe hath made her way good upon.

And laſtly, knowing how many leagues doth raiſe or lay de-gree upon the ſaid Romb, and true reckoning of your ſaid Courſe and Diſtance gives you the difference of Latitude or ths Parallel where the Ship then is: and alſo knowing how many leagues an-ſwer to a deg. of E. and W. in the ſaid Parallel, the Courſe, Di-ſtance, and Latitude gives the difference of Longitude or the Me-ridian, under which the Ship then is, the interſection of which ſaid Parallel and Meridian is the pick or place of the Ships then be-ing, of which things I will ſpeak more particularly afterward.

Now it reſteth to ſpeak ſomething of knowing the Longitude only by obſervation, which is very neceſſary to be known, that, thereby the one may make tryall of the other, being that if the ac-compt by dead reckoning, and alſo by Obſervation do both agree in the Latitude and Longitude, then you may be well aſſured, that you know truly the place where you then are, which Longitude by obſervation is thus kuown: prepare a very perfect and true running glaſſe, which may preciſely runne 24 houres without er-rour, and about the time that you purpoſe to ſet ſaile, ſet the ſaid

glaſſe a running juſt at 12 a clock, when the Sunne is upon the Meridian: being run out, be ſure to turn the ſaid glaſſe inſtantly as it is out: not loſing any time in the turning of it, and ſo having very warily kept the ſaid glaſſe till you think good to make an obſervation, at which time it is requiſite to have in readyneſſe an half-houre glaſſe, and a minute glaſſe, that if the 24 houre glaſſe be out before the Sunne comes to the Meridian, then ſo ſoone as it is out, to turn the half hour-glaſſe or minute-glaſſe as you ſée occaſion, thereby to know preſently how much the 24 glaſſe is out before the Sun comes to the Meridian: for if the Sun is upon the Meridian juſt when the 24 hour-glaſſe is out; then you may aſſure your ſelf that you have ſayled North and South, and are ſtill under the ſame Meridian you were at the firſt: but if the 24 houre-glaſſe be out before the Sunne come to the Meridian, for every 4 minutes that the glaſſe is out before noone: your difference of Longitude is 1 degrée to the Weſtward, and for every houre 15 degr. And contrary, if the Sunne come to the Meridian before the glaſſe is out, then according to the ſame proportion of time, is your difference of Longitude to the Eaſtward, which difference of Longitude if you multiply by the number of miles anſwerable to a degrée of Longitude in that Latitude, where you then finde your ſelf to be the, Product gives the miles of diſtance, that you are either to the Eaſtward or Weſtward of the Meridian that you are departed from.

The like may alſo be effected by any of thoſe fixed ſtars, whoſe true time of comming to the Meridian you know: For if the accompt of time preciſely kept by your glaſſe and the ſtars comming to the Meridian, as you finde in your Table of right Aſcenſion doe juſtly agrée, then are you ſtill under one and the ſame Meridian, but if the time be paſt by your accompt, that the ſaid Star ſhould be upon the Meridian before the Star doth come to the Meridian, for every houre that the Star comes to the Meridian, after the ſaid time paſt, your difference of Longit. is 15 deg. to the Weſtward, and for every houre that the Star comes to the Meridian before, by your accompt of time truly kept, it ſhould be upon the Meridian, your difference of Longitude, is 15 degr. to the Eaſtward,

Although

Although the Author of this Book in his time, knew of no other meanes [illegible]ine the Longitude, then by such as he hath here published, and by the Eclipses which seldom happen, yet seing it hath pleased God since his time, to reveal a manifest way (which cannot be stopped but it will come to perfection) to attain the Longitude; I suppose it necessary to speake something of it, because it fals out so fitly in this place.

There are wayes which are not (imaginary as some affirm) but reall and grounded upon as certaine Naturall principles as any Mathematical conclusions whatsoever in Geography or Navigation.

And howsoever, many may expect some excellent way for it, from forrain parts by certain small Starres neer Jupiter, and that some here at home would have the World conceited of a way by Celestiall Observation, yet it is without doubt; the Longitude must be found by Observation made of something below the Moon: for I doe truly affirme, that there are Magneticall poles, whose Latitude and Longitude I doe as certainly know, as concurrent Observations and Arithmeticall Calculations can discover them, and their Annuall motion I know, and by consequent the time of their Revolution. It may be objected, that the variation in many, nay, most places are very irregular, and not according to such Magnetticall Poles as I speak of, for in some places on the same Parallel in equall spaces, it altereth much swifter then in other, besides, in the Parallel of London, there is two deg. 00 Easterly variation to the Eastward of London, and 2 deg. 00 Easterly variation, to the Westwards of London, and yet both these places are to the East wards of the first Meridian of the World, within 45 deg. 0 min. of Longitude. It is true, but all this I can very well resolve, and I doubt not but to doe it for all places: moreover, there are some places within a certain Longitude, whose variations continue constant for hundreds of years, and yet afterwards do vary as ours here at London doth now, but at London it is never constant, although in former time the Variation of it was not sensible, it is now in its swiftest motion. It were to be wished (that as many

noble minded men have bẽn at charge oftentime's, to adventure towards the ſæking out of a paſſage North west into the South Sea, that ſome nobly-minded would take this into conſideration, that ſome noble men, furniſhed with convenient and exact Inſtruments, might make Obſervation to the Weſtwards: for the more full perfecting of this work, it would make much for their lacting Fame, and for the Honour of this Kingdom, but becauſe I am confined to to a little rome, I muſt abruptly end my diſcourſe of Longitude, only take notice, that thoſe that live untill the yéer of our Lord, 1657, ſhall not ſée any variation at all at London, and Afterwards it will encreaſe Weſterly at leaſt for 50 yéers, and now it reſts to ſpeak ſomewhat of ſome neceſſary helps for the finding thereof by dead reckoning as is before promiſed, but firſt I will ſpeak of the Variation.

## Of the Variation of the Compaſſe.

COncerning the Variation of the Compaſſe, it hath bẽn very learnedly treated on by divers of our Country-men, and in our vulgar tongue, and namelyby Mr. Norman, and Mr. Burrowes, in their Bookes called the New Attractive, and Variation of the Compaſſe: And ſince that, moſt excellently and ingeniouſly written of, by that rare and learned Mathematician of our time M. Wright, in his Book of the Correction of Errours in Navigation: as alſo in his Tranſlation called the Hiven-finding Art: In which reſpect it is nẽdleſſe for me here to write any thing thereof: only let it ſuffice to ſpeak a little thereof, and being neceſſary to the knowledge of the foregoing matter, for them that would willingly note how much the Compaſſe doth vary in ſeverall places of their ſayling. I think it beſt to have the Nẽedles of their Compaſſes touched upon a good ſtone, and ſo placed directly under the N. point of the Fly without allowing any Variation at all, the outer edge of the ſaid Fly to be graduated to each quarter into 90 degrées for the ready reckoning of the deg. that the Compaſſe doth vary from the true N. or S. either toward the E. or W. or over which Fly, it is neceſſary to have a round Circle of Walle with two ſights

ſights upon the ſame, the one directly againſt the other, at oppoſite points to be raiſed perpendicularly where occaſion ſhall ſerve: which Circle with the ſights thereon, as I have ſaid being placed upon the glaſſe over the Fly within the box, where the Compaſſe is: when you would obſerve the Variation of the Compaſſe, juſt either at the Sun ariſing or ſetting, turn the ſights in the Braſſe Circle towards the Sun, and looking through the ſame mark preciſely how many degrées the Sun riſeth or ſetteth from the E: or W. point of the Fly or Compaſſe: For if the Sun be in the Equinoctiall, having then no amplitude, ſo much as is the difference of the Suns riſing or ſetting from the E. or W. points ſhewed by the Compaſſe, is the variation of the Compaſſe from the true N. or S. but if the Sun be either to the Northward or Southward of the Equinoctiall having amplitude, then is there a reſpect alſo to be had to the Suns amplitude: as thus, if the Sun hath North or South amplitude, and that you obſerve the Sun to riſe or ſet ſo much from the E. or W. point of the Compaſſe, as is the Suns amplitude, and likewiſe the ſame way that the amplitude is, then hath the compaſſe no variation: but if the Sun having North amplitude, riſeth notwithſtanding more Northerly by your Compaſſe, then by the ſaid amplitude it ſhould do, the degrées of true amplitude deducted from the amplitude which the Compaſſe ſheweth, leaves the variation, of the Compaſſe to be Eaſtward of the North: but if the true amplitude be greater than the Compaſſe ſheweth the one deducted from the other, leaveth the variation to the Weſtward of the North, and if the amplitude be Southerly, and the Compaſſe ſhew the Sun to riſe Northerly, both the differences added together, gives the variation Eaſterly: or if the Amplitude be Northerly, and the Compaſſe ſhews it to be Southerly, then both the differences added together, give the variation Weſterly. All this is to be underſtood, when you obſerve by the amplitude Ortive, viz At the Suns riſing: for if you obſerve the ſetting thereof, then by adding or deducting the differences betwéen the true amplitude known, and the Amplitude given by the Compaſſe, the totall or remaine ſhews the Compaſſe to vary ſo much to the contrary ſide; an Example will

make all this plain unto you whichever it be thus proposed. Suppose that being at Sea, you finde by the Table of Sines hereafter set down (or by some other meanes) the Suns Amplitude at that time to be 20 degrees to the Northward, and setting the Suns at his rising by the Compasse (as is before shewed) you finde that the Sunne riseth, 35 deg to the Northward of the East, which is somewhat to the Northward of the North East, and by East point, therefore subtracting 20 deg. the Suns true Amplitude from 35 deg. the Amplitude which the Compasse sheweth, the Remainder being 15 deg. sheweth the Compasse to be so much varied from the North, to the Eastward which is 1 whole point, and about one ⅓ other: after the Sunne having the same Amplitude Northerly, (as is supposed) and setting him at his going down by the Compasse, the said Compasse sheweth him to set only 5 degrees to the Northward of the West, which deducted from 20 deg. the true Amplitude resteth 15 deg. for the variation of the Compasse to the Eastward as before,

As for Example.

Suppose that the Sunne having 23 degrees of South Amplitude, and the Compasse sheweth the Amplitude of rising to be 11 degrees Northerly, adde 23 deg. the true Amplitude, with 11 degrees of contrary Amplitude which the Compasse sheweth, and the product 34 degrees being three whole points and somewhat more, sheweth that the Compasse is so much varied from the true North to the Eastward.

Again, the Sun having the same Amplitude Southerly, you observe at his setting, and finde by your Compasse that he setting 11 deg. Northerly, adding the two Amplitudes as aforesaid, 23 and 11, the product 34 sheweth the variation so much to the Westward, being that in the Observation at his rising, the E. and by North points of the Compasse, standeth where the East Southeast should be: and at his setting in the other Observation, the West and by North points of the Compasse pointeth to the Sun, in which place should be the West Southwest points.

These seven Rules will suffice being (that albeit to the ignorant, they seem somewhat dark) yet in the practice thereof, they shall finde it, doubt not, but very plain and easie for their understanding

ing: otherwise there are sundry sorts of Instruments to finde the Variation by, but others having already written thereof, I have thought good also to shew my opinion of this plain and easie way, knowing that the Mariner, having made experience of many ways will onely use that which he findeth best, both for their ease, profit, and truth thereof. And note that whatsoever is here spoken concerning the finding of the variation by the Amplitude, the very like may be observed by the Azimuth, which by the Sunne or Starr being to be seen, may at any time be known.

## How many leagues sayling upon any point of the Compasse, will raise or lay a degree of Latitude, and what departure from the Meridian you make therewith.

This is so common in every Book, that I need not to write thereof, but onely being that it is a necessary help to that which hath been before spoken of, it is not amisse to set it here down being as followeth.

First, sayling S. or N. you keep still one Meridian: and in sayling 20 *English leagues, you either raise or depresse the Pole 1 deg. But if you sail upon the first point or Rombe from N. or S. either Eastward or Westward, you must sail 20 leagues and one third part to raise or lay a degree of Latitude, and so having changed your Parallel 1 deg. you are also departed from your first Meridian 4 leagues, the way which your course was.

Upon the second point or Rombe from N. to S. 21 leagues, and one third, raise or lay a degree of Latitude and your distance from the Meridian is 8 leagues and one third.

Sayling upon the third point 24 leagues to raise or lay a degree and distance from the first Meridian is 13 leagues and one third.

* Here note that although the Author hath set down 20 *English* leagues, yet it must be 20 such leagues as answer to 1 degree of the Meridian; and therefore the knots on the Log-line must be so set asunder at least, according to the late experiment made by Mr. *Richard Norwood*, which experiment was formerly verified by practice at Sea, by Captain *Thomas Fox* in his voyage to the Northwest, as ye may see in the 7 page of his Journall, by the Course, Distance, and Latitudes, from the *Blake* (on the West of *Ireland*) to *Cape Farewell*, compared with Mr. *Norwoods* Experiment.

But because many will hardly be drawn to alter their knots from their old Forme. Therefore if any man will multiply 112, by the Knots run out in half a minute, the Product, cutting off two Figures to the right hand, shall be the number of leagues run in a Watch, according to Mr. *Norwoods* Experiment.

Upon

Upon the fourth point 28 leagues and one third, raise or lay a deg. of Latitude, and distance from the Meridian is 20 leagues.

Upon the fifth point 36 leagues, raise or lay a degree of Latitude, and distance from the Meridian, is 30 leagues.

Sailing upon the first point, or Rombe 52 leagues and one third raise or lay a degree, and having altered your Latitude one degree upon that point, you are departed from the first Meridian 48 leagues and one third.

If you sail upon the seventh point, being the next from the East or West, you may sayl 102 leagues and 2 third, before you raise or lay the Pole one degree, and then are you 101 leagues from your first Meridian, but if you sail East or West, then are you still in a parallel, and neither raise nor lay the Pole at all.

## To finde the Distance between any two places, knowing the Longitude and Latitude of them.

IF the two places differ onely in Latitude, then are they both under one and the same Meridian; and to know the distance betwixt them in miles or leagues, multiply the number of the degree of difference by 60 miles or 20 leagues, the Product of which multiplication gives the true distance between them in miles or leagues, according as you work them, being that 60 miles or 20 leagues, make 1 degree of a great Circle: but if the one place have N. Latitude, and the other S. then adde both their Latitudes together, and work as aforesaid: and if both the places are under the Equinoctiall then have they no Latitude. And there likewise 60 miles or 20 leagues makes 1 degree, and the working like the former, if the difference be under 180 degrees. For if the difference be more than 180, subtract the said difference from 360, and multiply the remainer by 60 or 20 as before.

These are so plain and easie that they need no Examples: but if they differ both in Longitude and Latitude, or in Longitude onely, in any Parallel beside the Equinoctiall the working is somewhat more difficult, by reason that the further the Parallels are distant from the Equinoctiall towards either of the Poles, the shorter they are, and the shorter the Parallels are, the fewer min. or miles make

a deg. so that whereas in the Equinoctiall 60 min. or miles make a deg. in that Parallel where the Pole is raised 52 deg. 37 min. makes 1 deg. viz. 1 deg. in the Latit. of running in E or W. answers to 37 miles: for which purpose as also for divers necessary uses I have here added a Table shewing the miles of distance and minutes of time answerable to a degrée in every severall degrée of Latitude from the Equinoctiall towards either of the Poles: And when you know the miles answerable to a degr. in the Parallel desired, if the difference of the two places be only in Longitude, multiply the difference of their Longitude by number of miles answerable to a degree: and the Product sheweth the distance in English or Italian miles betwixt the said two places.

Example.

London and Midleborough, have both in a manner one Latitude, viz. about 52 degr. 37 and I finde in this Table, that in the Parallel of 52 degr. 37 miles make a degr. of Longit. the Longit. of London is 25 deg. 50 min. which subtracted one from another leaves 3 degr. 50 min. for the difference of Longitude. Then multiplying 3 deg. by 37 miles, the Product is 111 miles: Then for 50 min. I say by the Rule of 3, If 60 min. gives 37 miles, what gives 50 minutes. Facit neer 31, which added to 111, makes 142 miles, or 47 leagues and a mile, for the distance betwixt London and Middleborough.

But if the two places differ both in Longitude and Latitude, then is the working more difficult then either of the former: For first you must take the difference the two places in Longitude, and then their difference also in Latitude, and multiplying the degrees of their difference in Latit. by 60, set the Product thereof by it self, for the first number: then multiply the

| Deg. of Latit. | Min. to a Deg. | Deg. of a Latit. | Min. to a Deg. |
|---|---|---|---|
| 0 | 60 | 60 | 30 |
| 10 | 59 | 61 | 29 |
| 15 | 58 | 62 | 28 |
| 18 | 57 | 63 | 27 |
| 21 | 56 | 64 | 26 |
| 24 | 55 | 65 | 25 |
| 26 | 54 | 66 | 24 |
| 28 | 53 | 67 | 23 |
| 30 | 52 | 68 | 22 |
| 32 | 51 | 69 | 21 |
| 34 | 50 | 70 | 20 |
| 35 | 49 | 71 | 19 |
| 37 | 48 | 72 | 18 |
| 38 | 47 | 73 | 17 |
| 40 | 46 | 74 | 16 |
| 41 | 45 | 75 | 15 |
| 42 | 44 | 76 | 14 |
| 44 | 43 | 77 | 13 |
| 46 | 42 | 78 | 12 |
| 47 | 41 | 79 | 11 |
| 48 | 40 | 80 | 10 |
| 49 | 39 | 81 | 9 |
| 51 | 38 | 82 | 8 |
| 52 | 37 | 83 | 7 |
| 53 | 36 | 84 | 6 |
| 54 | 35 | 85 | 5 |
| 55 | 34 | 86 | 4 |
| 57 | 33 | 87 | 3 |
| 58 | 32 | 88 | 2 |
| 59 | 31 | 89 | 1 |

difference of Longit. by the number of miles answerable to each Latit. severally, and adde both the Products together: the half whereof set down for your second number, and multiplying each of the said two numbers into it self squarely, adde both the Products together, and extracting the square root thereof, the said square root is the distance betwixt the two places desired.

As for Example.

To go directly in a right Line from Calice in France to Constantinopl: in Grecia: I finde by the Tables following, that the Longitude of Calice is 29 deg. 10 min. and the Latitude thereof 50 deg. 40 min. And the Longitude of Constantinople is 61 degr. 20 min. and the Latitude 44 degrees 40 min. then subtracting the lesser Longit. from the greater, the Difference of Longitude is 32 deg. 10 min.

| | | | |
|---|---|---|---|
| Constantin. | 61 deg | 10 min. | Longit. |
| Calice, | 29 degrees | 10 min. | |
| Difference, | 32 degr. | 10 min. | |
| Calice, | 50 degrees | 40 min. | Latit. |
| Constantin. | 44 deg. | 40 min. | |
| Difference, | 6 degrees | 0 min. | |

Also I take the one Latitude from the other, and there rests 6 deg. for the difference thereof, which 6 deg. multiplyed by 60 miles produceth 360 miles for the distance betwixt the Parallel of Calice, and the Parallel of Constantinople. Now for the distance betwixt Calice and the Meridian of Constantinople, I multiply 32 degrees 10 minutes, the difference of Longitude by 38, the miles answerable to a degree in the Parallel of Calice, and the Product is 1222 miles: Then multiply 32 degrees 10 minutes, the aforesaid difference of Longitude by 42 miles answering to a degree in the Parallel of Constantinople, which Product being 1351 miles, is the distance betwixt Constantinople and the Meridian of Calice: Those two distances added together make 2573, the halfe whereof, being 1286 is the mean distance betwixt the Meridians of the said two places: So have you two numbers, viz. 360 miles, the distance that the parallel of Constantinople is to the Southwards of Calice, and 1286 miles, the Distance that Constantinople is to the Eastward of the Parallel of Calice: Therefore if you multiply 360 into it self, the Product is 129600. And likewise multiplying 1286 into it self the

| | | | |
|---|---|---|---|
| 1 | 2 | 2 | 2 |
| 1 | 3 | 5 | 1 |
| 2 | 5 | 7 | 3 |
| 1 | 2 | 8 | 6 |

Product

The manner how to Extract the square and Cube root of any number, is more plainly taught, toward the end of the Booke.

Product is 1653796, which both added together, make 1783396, the square root of which number is the distance desired: Which to help those that are not perfect in extraction of Roots, I have here set down the working thereof as followeth :----

First, I set down the proposed number with a Quotient, and under the last figure, I put a pick: and so likewise under each other Figure toward the left hand, leaving betwixt each pick one Figure unpickt: So have I under this number 4 picks, signifying that the roote must consist of four Figures, and to finde them out, I seeke what is the greatest Square number over the first pick, which is 1, therefore I put 1 in the Quotient for the first Figure of the Root, and cancell the Figure over the first pick; Then to finde the second figure of the Root, I multiply the Quotient by 20, which being 1, doth neither multiply nor divide; therefore I seek how often 20 is contained in 78, the number of the second pick, which you must take no oftner then that the Square of the said number being added therewith, may be likewise taken there-from; so I see 3 times 20 being 60, and the Square of 3 which is 9, added thereto, is 69, which may be taken there-from; therefore I put 3 in the quotient, taking 69 from 78, the number over the 2. pick, leaves 933 to the 3. pick: then for the 3. figure of the Root, I multiply 13 the Quotient, by 20 the Product is 260, which I seek how often it may be taken out of 933, and I find that 3 times 260 is 780, whereunto the Square of 3 being added, makes 786 therefore I put 3 in the Quotient, and subtracting 789 from 933, rests 14496 for the 4. pick, then for the last Figure of the root, I multiply: 133 the the whole quotient already found by 20, and the product is 2660 which may be taken five times in 14496, for 5 times 2660, is 13300, unto which

1653796
129600
1783396

1783396 | 1

1783396 | 1

x 20
1
20
3
60
9
69

9
x 1783396 | 13
x
69 13
20
260
3
790
1 9
844 789
x 1783396 | 133
1 133
69 20
789

25 the

25 the Square of 5 added, makes 23325. Therefore I put 5 in the Quotient, for the fourth and last Figure of the Root, and making my subtraction as afore, the work will stand as you see, by which you may know the square roote of the proposed number to be 1335 and very neer $\frac{3}{7}$ So I conclude, the true distance betwéen Calice and Constantinople to be 1335 miles, and neer $\frac{1}{5}$ mile. The manner how to extract the Root of any number is set down more at large after the tables of Sines.

| | | |
|---|---|---|
| | 789 | 2660 |
| | | 5 |
| | | 13300 |
| xII | | 25 |
| 94471 | 13322 | |
| x78 3396 | 1335 | |
| x69 | | |
| 789 | | |
| 13325 | | |

But for the finding of the Distance of Places, here followes an easier way and more naturall by the Table of *Sines*, which will be necessary to make use of the Table of *Longitudes* and *Latitudes*, as also to make tryall of the Difference that is between the true Distance of Places as they are upon the *Globe*, and as most of them are laid down upon the plain *Sea-Card*.

1 IF one place be under the Equinoctiall and the other have Latitude, and their difference of Longitude be 90 deg. 0 min. then their distance asunder is 90. deg. 0 min.

2. If one place be under the Equinoctiall and the other have Latitude and their difference of Longitude be more then 90 degr. 0 min. subtract 90 deg. 0 min. from it, and seek the sine of the remainer and adde it to 10000, and multiply the summe by the sine of the Complement of the Latitude of the other place, cutting off 4 Figures to the right hand from the Product, and from the rest subtract to the sine of the Complement of the Latitude given, and the remainer shall be the sine of the Complement of the Distance betwéen the two places, unto the arch of which sine adde, 90 deg. 0 min. and the whole is the distance required.

But if their difference of Longit. be lesse than 90 deg. 0 min. subtract it out of 90 deg. 0 min. and seek the sine of the remainer and multiply it by the sine of the Complement of the Latitude given cutting off 4 figures to the right hand from the Product, and the rest is the sine of the complement of the distance betwéen the two places.

3. If

3. If both places have Latitude, adde one Latitude to the Complement of the other, and seek the sine of the summe, which sine keep. Then if the difference of Longitude be more then 90 deg. 0 min. seek the sine of the excesse above 90 deg. 0 min. and adde it to 10000, which summe keep, but if it be lesse than 90 deg. 0 min. seek the sine of the Complement of it, and subtract it from 10000. and keep the remainer, next multiply the summe kept or this remainer by the sine of the Complement of one Latitude cutting off figures to the right hand of the Product, and the rest multiply by the sine of the Complement of the other Latitude, cutting off also 4 figures the right hand of the Product and take the difference between this last Product and the sine of the summe of the complement of one Latitude added to the other Latitude, which difference shall be the sine of the Complement of the distance between the two places.

Note, if the last Product be equall to the sine of the summe of the complement of one Latitude added to the other Latitude, the two places are 90 deg. 0 min. distant asunder; but if it be lesse than the said sine, they are lesse than 60 deg. 0 min. asunder; but if it be more than the said sine, then the former difference is the sine of the excesse above 90 deg. 0 min. unto which adde 90 deg. 0 min. and the whole is the distance required.

Example of the 2.

The Iland of S. Thomas under the Equinoctiall Longit. 58 degr. 0 min. and Java minor Longit. 151 deg. 0 min. & Lat. 8 deg. 0 min. difference of the Longit. 113. deg. 0 min. the excesse above 90 deg. 0 min. is 23 deg. 0 min. the sine 2508 which added to 10000. the sum is 13908. the Complement of the Latit. given 82 deg. 0 min. the sine is 9903 which multiplyed by 13908, the Product is cutting off 4 figures to the right hand 13373, from which subtract 19903 the sine of the Complemnt of the Latitude, the remainer is 3870 the sine of 22 degr. 46 min. unto which adde 90 degr. 0 min. and the whole is 112 deg. 46 min. which multiplyed by 60 and the 46 min. added is 6766 miles, the distance of the two places.

Example of the 3.

Nova Zembla Longit. 83 deg. 29 min. and Latit. 47 deg. 0 min.

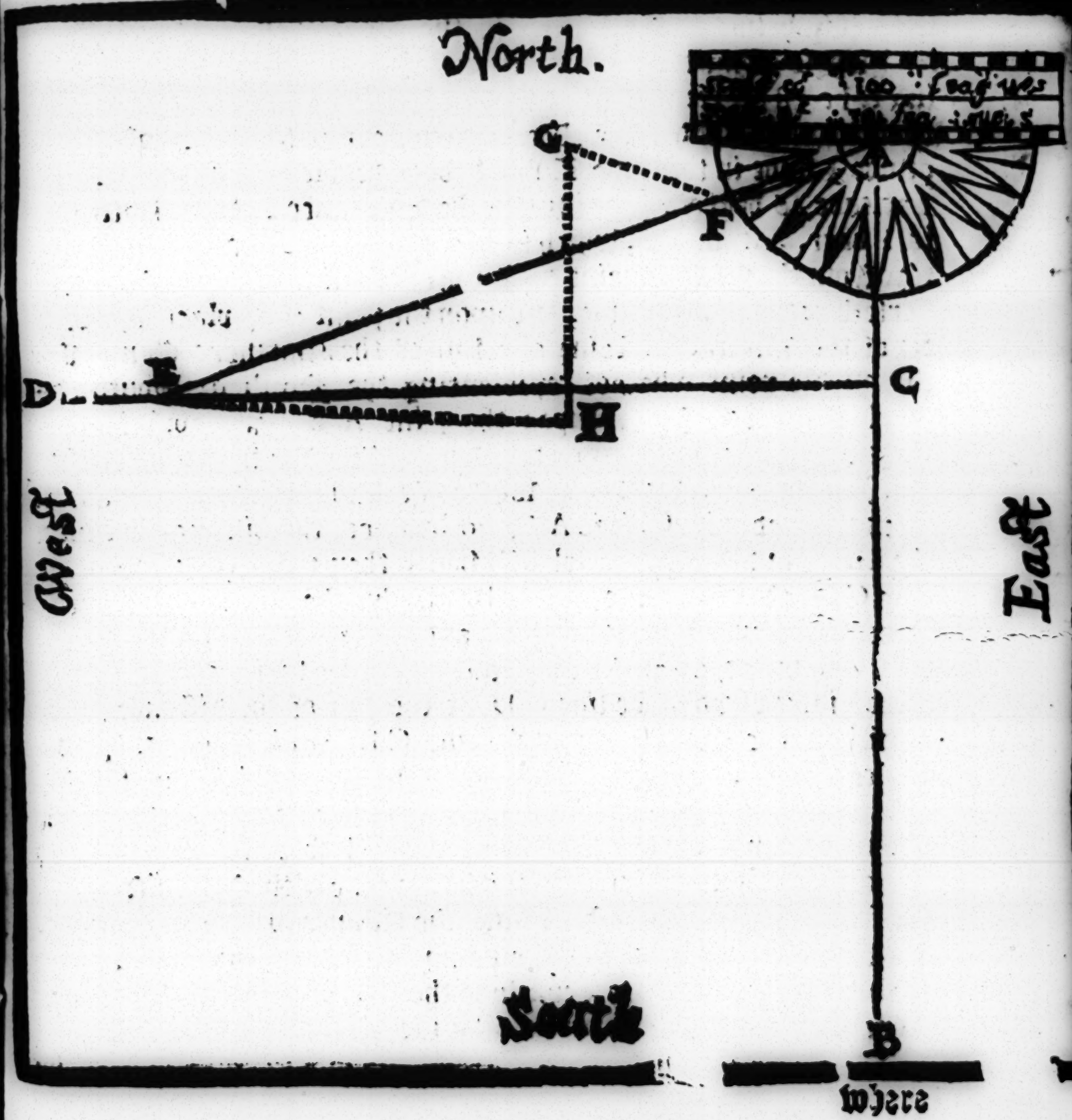
and

and the Plymouth in new England, Longit. 315 degrees 0 min. and Latitude 41 degr. 37 min. Lesser Latit. added to the Complement of the greater, the summe is 57 degr. 37 min. whose sine is 8445. the difference of Longit. 138 deg. 29 min the excesse above 90 deg. 0 min. is 38 degr. 29. min. whose sine is 6223. which added to 10000 the summe is 16223. Which multiplyed by 7476 the sine of the Complement of 41 degr. 37 min. the Product is 121 28. Also this multiplyed again by 2756. the sine of the Complement of 74 degr. 0 min. the last Product is 3342 which subtracted from the sine of the summe of one Latit. & added to the Complement of the other Latitude, viz. the sine of 57 deg. 37 min. that is 8445, and the remainer is 5103, the sine of 30 deg. 41 min. whose Complement is 59 degrees 19 min. which being multiplyed by 60, makes 3559 miles the distance required.

The ingenious Mariners may sayle by knowing the true Longitude and Latit. of places, to any place assigned as well by a blank of paper or past-board as by his Sea-Card by the help of a Protracter in this manner: First, upon the board or paper lined with Meridians and Parallels or to them can make a right Angle upon any pitch or point, a sheet of clean paper is sufficient to keep a Traverse upon. To know your course from the place where you are to any other place assigned, according to the plain Sea-Card as I say, upon your bord or paper make a pitch for the place where you then are, and from the said pitch make a right line to represent the Meridian of the same place: Then placing the Center of the Protracter upon the said pitch, lay the N. or S. point of the fly or Protracter as the place beareth, upon the line ready drawn. Then by the last Chapter learn the distance of Miles betwixt the place where you are, and the Parallel of that place you are bound to: or more briefly what portion of the Meridian is comprised between the Latit. of the two places: that distance by the Scale of the Protracter, apply to the Meridian by you drawn, and where the distance ends, draw another line square or at right Angles to the other, either E. or West, as the scituation of the place assigned requireth: and by the former Chapter learn the distance betwixt the Meridian by you drawn, and the Meridian of the other place assigned: which known

knowen (by your Scale) apply that distance to your line of East or West, and where that number of distance ends, make another prick for the true situation of your place assigned: then laying a third or Ruler from the Center of the Protraction, being the place

Type of a Traverse-boord and a Protractor.




where

where you are, and extending it to the other prick last made, the edge of the Ruler or line shews upon the Protractor the point of the Compasse that the place assigned bears from the place where you are; and the Scale applyed to the said line or edge of the ruler, shews the distance: also the distance may be known by extracting the square Root, as is before shewed in an Example of this, and for the use of the Traverse-bord, and so an end.

A ship being at the Lizard, in the Southwest parts of England, whose Longitude and Latitude I finde in the Table following to be 18 degrées 30 minutes, and 50 degrées 10 minutes, is bound for an Iland in the Mean Sea, called Maida, whose Longitude I finde in the same Table to be 2 degrées 40 minutes, and Latitude 46 degrées 40 minutes, the difference of their Latitude, is 3 degr. 30 minutes, which is 210 miles, or 70 leagues: Therefore from the prick or point A, I draw the line A B, in the Traverse-bord here adjoyning; and upon the point A, I place the center of the Protractor, being one half of the Mariners Compasse, the middle point whereof representing the North or South (as occasion serves) I lay upon the Line A B, and applying 70 leagues whereof the scale on the edge of the Protractor, conteins 100) from A, towards B, where the said 70 ends, I make a prick marked with C, so is A C, 70 leagues, the distance between the Lizard and the Parallel of Maida, then from C, I draw the line C D, at right angles to A B, and by the former Chapter I finde the distance betwixt Maida, and the Meridian of the Lizard to be 629 miles, or 209 leagues and 2 miles: which by the Scale aforesaid, applyed to the line C D, at the end of the distance I set a prick marked with E; so is the line C E, $209\frac{2}{3}$ leagues, the distance that Maida is to the Westward of the Meridian of the Lizard or the line A B, then the Protract lying as at the first, I lay a Ruler from the Center thereof to the last prick E, and with the former scale, measuring along by the edge of the Ruler from A, the first prick to E, the last, I finde the distance to be 222 leagues, and the ruler cuts the point West and by South and half a point to the Southwards. So I conclude the Ile of Maida to be distant from the Lizard 222 leagues, and the direct course West and

by

by South, and halfe a point Southwards.

But if the wind be scant or contrary, so that you cannot saile by the direct course; then must you keep a reckoning how many leagues you sail upon every other point; and where you change your course, there place the Center of the Protractor, keeping the Meridian or North and South line of the Protractor Parallel to the Meridian drawn on the Traverse-board and laying a ruler from the Center of the Protractor, along that point upon which the ship maketh her way, and to the edge of the ruler so placed, apply so many leagues of the Scale, as the Ship hath sailed upon that point, and then where that number ends, set a prick for the place where the Ship then is; and again, upon that prick place the Center of the Protractor laying as before the South and North line thereof parallel to the Meridian, or South line first drawn, and then laying a ruler to the Center of the Protractor being the place where the Ship then is, and to the place assigned, it shewes upon the Protractor, that point how they beare, and the Scale applyed thereto shewes the distance, as in the former Example: Having sailed from the Lizard in the right course 50 Leagues being in the point F. the wind commeth to another point, so that she maketh her way West and by North 40 Leagues: at the end of which course is the letter G, from thence she runneth South 75 Leagues; at the end of which course is H, then from H, to know the distance, and what course must be kept to the prefixed place of Maida marked with F, I place the Center of the Protractor upon H, and the edge thereof, which is then North and South Parallel or equidistant to the first line A B, which so placed, I lay a ruler from the Center thereof to E, and I finde the course to be West and half a point to the North 125 Leagues.

Note, that it is necessary to have upon your Protractor two severall Scales a greater and a lesser, for the greater the Scale is you keep your reckoning by, the truer shall your account be.

## Necessary Questions of Navigation, with their Answers.

IF I saile from the Parallel of 50 degrées 70 leagues upon a South-west course, I demand how much I lay or depresse the Pole, and how many degrées, and leagues I depart from the Meridian?

Answ. Pole depresses 2 deg. 28 min. difference of Longitude 3 deg. 51 min. leagues from the Meridian 49 and $\frac{1}{3}$.

Q. 2. If I saile from the Parallel of 40 degrées upon a West Northwest course, untill I raise the Pole 3 degrées 30 min. I demand how many leagues I have sailed? And how many degrées and leagues I have departed from the Meridian?

A. Leagues sailed 183, difference Longitude 11 deg. 20 min. leagues from the Meridian 169.

Q. 3. From the Parallel of 47 deg. N in sailing 108 leagues between West and North, I raise the Pole 2 deg. I demand upon what Rombe I have sailed? As also how many deg. and leagues I am from the Meridian, from whence I began the Course?

A. A Rombe Northwest and by West, difference Longitude 6 deg. 47 min. leagues from the Meridian 90.

Q. 4. If from the Parallel of 50 deg. I sail so long between North and East, till I raise the Pole 6 deg. difference of Longitude 4 degrées? I demand upon what point of the Compasse I have sailed, and how many leagues I have run?

A. The Course is near N. Northeast, leagues runne 130.

Q. 5. If from the Parallel of 50 degrées I sail Northwest untill the difference of Longitude be 4 degrées, I demand how many leagues I have sailed, and how much the Pole is raised?

A. Leagues sailed 70 and two thirds, Pole raised 2 deg. $\frac{1}{3}$

Q. 6. Two ships departing from one place of the Parallel of 50 degrées, the one in sailing 145 leagues towards the West hath

hath raised the pole 4 degr. and the other hath raised the pole 7 degr. and is 93 leagues West from the Meridian of the place from whence he began his course; I demand by what course the said ships have sayled, how many leagues the 2 ships have sayled, how far they are asunder, and by what course they may meet?

A. The first ship hath sayled Northwest and by West: the second hath sayled Northwest by North 169 leagues, they are asunder 65 leagues and a half, and the course between them is North Northeast and South southwest, more 0 degr. 55 min. East, and 0 deg. 55 min. west.

Q. 7. Two ships departing from one place in the paralell of 60 degrees, the one in sayling 145 leagues towards the West, hath raised the pole 4 degr. and the other hath raised the pole 7 deg. and is 93 leagues West from the Meridian of the place from whence he began that course: I demand by what course the said ships have sayled, the sum of the two ships how far they be asunder, and by what course they may meet?

A. The first hath sayled Northwest and by West, the second hath sayled Northwest and by North 168 leagues, they are asunder 66 leagues Easterly; Course between them is North northeast points Easterly.

Q. 8 The two ships sayling from one place in the Paralell of 60 deg. the one sailing 180 leagues Eastwards, hath raised the Pole 5 deg. I demand upon what Course, and how many leagues the ship shall sayl to bring himself 50 leagues North by West from the first ship, and what they are both departed from their Meridian.

A. The first ship hath sayled Northeast and by East and is departed from the Meridian 14 leagues. The second ship must sail Northeast 2 deg. northerly leagues 204, and is departed from the Meridian where he began his course 139 leagues, and 9 tenths.

Q. 9 If I sayle from the Paralell of 50 degr. 100 leagues North, I demand what Latitude I am in.

A. In the Latitude of 55 degrees.

Q. 10. If I sayl from the Paralell of 50 deg South, till I lay the Pole 5 deg. I demand how many leagues I have sayled.

A. 100 Leagues.

Q. 11. If from Longitude 22 degr. I sail in the Parallel of 60 degr. 100 leagues East, I demand what Longitude I am in?

A. In Longitude 32 degrees.

Q. 12. If from Longitude 22 degr. I sayl in the Paralell of 50. deg. to Longitude 10 deg. I demand how many leagues I have sayled?

A. Leagues 153 and a half.

Q. 13. If I sayl from Longitude 20 deg. and Latitude 40, to Longit. 350 deg. 27. min. and Latit. 30 degrees, I demand the Rombe and Distance?

A. Course West South-west, distance 522 leagues.

Q. 14. From Longitude 20 deg, and Latitude 45 deg. North-east 20 leagues, what Longit. and Latit. hath the second place?

A. 20 Deg 45 min. Longitude, 45 deg. 42 min. Latitude.

Q. 15. From Longitude 23 degr. and Latitude 45 deg. 42 min. East and North 30 leagues, what Longit. and Latit. hath the second place?

A. 25 Degr. 55 min. Longitude, 46 degr. Latitude.

Q. 16. From Longitude 23 degr. 9 min. and Latitude 45 deg. 59 min. East southeast 25 leagues. What Longitude and Latitude hath the second place?

A. 27 Deg. 33 min. Longitude, 45 deg. 31 min Latitude.

Q. 17. From Lonitude 27 deg. 33 min. and Latitude 45 deg. 31 min. North 40 leagues. What Longitude and Latitude hath the second place?

A. Longitude 27 deg. 33 min. Latitude 47 deg 31 min.

Q. 18. From Longitude 27 deg. 33 min. and Latitude 47 deg. 31 min. 50 leagues West Northwest. What Long. and Latitude hath the second place?

A. Longitude 14 deg. 23 min. Latitude 48 deg. 28 min.

Q. 19. From Longitude 23 deg. 57 min. and Latitude 48 deg. 28 min. East Northeast 60 leagues. What Longitude and Latitude hath the second place?

A. Longitude 28 degrees 23 minutes, Latitude 49 degr. 36 minutes.

Here

## Here followeth a brief Table of *Sines* for Arithmeticall calculation, the totall *Sine*, whereof is 10000, with certain necessary Propositions to be wrought thereby, by which few things proposed, and Examples thereto annexed, any one that heth either an ingenious Spirit, or a willing Mind to the Practice of the Mathematicall Sciences, may attaine to much knowledge therein.

### *A brief Declaration of the same.*

WHat the Table of Sines is, hath been very learnedly explained by others, and therefore needlesse is it for me to discourse thereof; only take these few Instruction for the help of those, which as yet have no knowledge thereby. First, know that Sailing which is the principall thing here aymed at, is performed by a true and perfect knowledge of the Sphear, by the projection whereof all Calculations, Tables calculated, and Instruments for Observations are invented, protracted, framed and made.

What the Sphear is I need not to discusse, the cheif or great Circles thereof consisting of 360 degrees, and one quarter thereof being 90 degr. which quarter being taken from the whole Circumference, consisteth of these three particulars viz. An Arch or part of a Circle, being indeed 90 deg. or a quarter of the whole Circle, a right Angle, and two equall sides thereto, of which the one is the base or ground Line, the other a perpendicular let fall thereon at right Angles, the utmost ends or Extentions of which two lines are the limmits of the aforesaid arch, or quarter of a Circle: the which three parts so fitted together in their due order, sheweth the perfect platform of one quarter of the whole Circle, commonly called a Quadrant: the base or ground lin whereof being divided into 10000 equall parts, is Sinus totus or the whole Sine: and the whole Arch or quarter of a Circle into 90 degrees, is the whole Arch belonging to the said whole Sine.

Within which Quadrant, any number of degrees or min. counted from the beginning or first perpendicular may be called an Arch or part of a Circle, and another perpendicular let fall there-from to the

the aforesaid base or ground line, the number of equall parts that the said perpendicular falleth upon, is the right sine, to the arch given: and the complement of the Arch given, is the remainer thereof, it being taken from 90 deg. or the whole Quadrant. To find out the right sine of any given arch, look in the head of the Table following for the deg. thereof, and if there be any min. therewith, look for the minutes at the left side of the Table, and carrying your eye downward from the deg. till you come right against them in the number which you finde in the common Angle to them both is the right sine of your given arch desired, as if you desire the sine of 35 deg. 20 min. look in the head of the Table for 35, and upon the left side thereof for 20, and in the common square or angle right against them both, you shall finde 5783 which is the sine of 35 deg. 20 min. and if you subtract 35 deg. 20 min. from 90 deg. the remainer 54 deg. 40 min. is the complement thereof whose right sine (found as before is taught) is 8158, what the verted sine is, and how found out, is afterward shewed. Question, but that these few words will suffice for the explaining of the Table following, whose large and ample uses for Navigation, and other the Mathematicall practises, these following exemplary Propositions, will in some reasonable sort make manifest: by which here proposed and answered, the ingentious may gather the manifold uses thereof, being that indeed the benefit to be reaped thereby is great, and the propositions to be wrought thereby infinite. Who so desires more perfection in this kind of Navigation, and generally in all Mathematicall practises, let them spend some time in the study of Petiscus: of the Doctrine of Triangles, not long since translated and published in our English tongue by Mr. Ralph Handson.

## *Certain Propositions to be wrought by the Table of Sines.*

### The Sunnes true Place being known, to finde his Declination. Prop. 1.

As the whole sine is to the sine of the greatest declination, so is the sine of the Sunnes distance from the nearest Equinoctiall point, to the sine of the declination for the day proposed.

#### Example.

Suppose the true place of the Sun to be in 20 deg. 36 min. of Taurus

Taurus which is 50 deg. 36 min. from the beginning of Aries, or the vernall Equinoctiall point; therefore I must multiply the sine of 50 deg. 36 min. the Suns distance from the Equinoctiall point by the sine of 23 deg. 32 min. the greatest Declination; and that Product must be divided by the whole sine, whose severall Sines being found out in the Table following, and set in order, the work will stand thus.

| | | | | |
|---|---|---|---|---|
| If 90 | give | 23.32 | what | 50.36 |
| 10000 | | 3993 | | 7727 |

Facit 3085, whose nearest Arch 17 deg. 58 min. is the true Declination of the Sunne, the day and year aforesaid.

## The Declination of the Sunne given, to finde his Place in the Zodiack. Prop. 2.

AS the sine of the greatest declination is to the whole sine, so is the sine of the Declination for the day proposed to the Suns place, or distance from the nearest Equinoctiall point.

### Example.

Suppose I finde that the Declination of the Sunne is 17 degr. 58 minutes North; therefore I say:

| | | | | |
|---|---|---|---|---|
| If 23.32 | give | 90 | what | 17.58 |
| 3993 | | 10000 | | 5083 |

Facit nearest 7727, whose Arch 50 deg. 36 min. is the Sunnes distance from the vernall Equinoctiall point of Aries, from which taking 30 deg. the whole sine of Aries, the remainer 20 deg. 36 min. shews the Sunne to be so much entred into Taurus, which is the next Sine.

## The Latitude of any place, and the Declination of the Sunne given to finde the Amplitude. Prop. 3.

AS the sine of the Complement of the Latitude is in proportion to the whole sine, so is the sine of the Sunnes declination to the Amplitude.

### Example.

The Suns declination being 11 deg. 48 min. North, I desire the Amplitude of the Sunne, viz. How much the Sun doth rise, and set from the true East and West point of the Horizon, towards

towards the North or South, in the Latitude of 51 deg. 40 min. to know which, the work is thus.

If 38 deg. 20 min. the Complement of the Latitude, give 90 degrées the arch of the whole sine, what gives 11 deg. 48 min. the declination of the Sun.

| | | | |
|---|---|---|---|
| 38 deg. | 20 min. | 90 | 11.48 minutes |
| 6202 | | 10000 | 2045 |

Facit 3297 nèreſt whoſe arch ſought out in the Table of ſines, is 19 deg. 15 min. for the Amplitude of the Sunnes declination propoſed: the ſame divided by 11 and 1 quarter, the number of degrées that belongs to a point of the Compaſſe, sheweth one point and 8 deg. which the Sun riſeth and ſets to the Northward of the Eaſt and Weſt, being that the declination is North, for if the declination were South, then were the Amplitude ſoutherly.

## The Declination and Amplitude of the Sunne given, to finde the height of the Pole.

### Prop. 4.

As the ſine of the Amplitude is in proportion to the ſine of the Declination, ſo is the whole ſine to the ſine of the Complement of the Latitude.

### Example.

The Declination 11 deg. 43 min. and the Amplitude 19 deg. 7 minutes, I demand the height of the Pole? Say.

| | | | | | |
|---|---|---|---|---|---|
| If | 19.7 | give | 11.43 | what | 90 |
| | 3275 | | 2031 | | 10000. |

Facit 6202 nèreſt whoſe arch in the Table of ſines being 38 degrées 40 minutes is the height of the Equinoctiall, or the Complement of the Latitude: That ſubſtracted from 90 degrées leaves 51 degrées 40 minutes, for the height of the Pole, or Latitude of the place deſired.

## The true place and Declination of the Sunne given, to finde the right Aſcenſion. Prop. 5.

As the ſine of the Complement of the Declination is to the totall ſine, ſo is the ſine of the Complement of the Suns diſtance from the beginning of Aries, to the Complement of the right aſcention.

Exam-

## Example.

I desire the right ascention of the Sunne being in 10 degrees 14 min. of Taurus, in which place his Declination is 14 deg. 56 min. and the Complement thereof 75 deg. 4 min. and the distance from the beginning of Aries 40 deg. 14 min. whose complement is 49 deg. 46 minutes? I say then

| | | | | |
|---|---|---|---|---|
| If | 75.4 | give | 90 | what | 49.46 minutes? |
| | 9663 | | 10000 | | 7934 |

Facit, 7900: whose arch in the Table of Sines is 52 degrees 11 min. the complement whereof 37 deg. 49 min. is the Sunns right ascention the same converted into houres, by allowing 15 deg. to an houre: gives 2 houres 31 minutes 16 seconds.

This is to be understood, when the Sunne is betwixt the beginning of Aries, and the Tropick of Cancer; for if the Sunne be in the Tropick of Cancer, then is the right ascention 90 deg. or 6 houres: and if the Sunne be betwixt the Tropick of Cancer and the Equinoctiall point of Libra subtract the distance that the Sun is from the beginning of Aries, out of 180 degrees, and with the remainer work as before for the right ascention, which ascention so found, take from 180, and the remainer is the right ascention desired. But if the Sun be betwixt the Equinoctiall of Libra, and the Tropick of Capricorn, subtract the said distance from the beginning of Aries, out of 270 degrees, and if betwixt the Tropick of Capricorn, and the beginning of Aries, take the said distance out of 360 degrees, and then work as before. One Exemple or two will make all this plain unto you.

The true place of the Sun being 17 degrees, 51 min. of Cancer, is 107 deg. 51 minutes, from the beginning of Aries, which taken from 180, leaves 72 deg. 9 minutes, whose complement is 17 deg. 51 minutes the Sunnes Declination being then 22 deg. 20 min. the complement thereof 67 deg. 40 minutes, Say then

| | | | | |
|---|---|---|---|---|
| If | 67.40 | give | 90 | what | 17.51. minutes? |
| | 9250 | | 10000 | | 3065. |

Facit 3314 whose arch is 19 deg. 21 min the complement whereof 70 deg. 39 min. taken from 180, leaves 109 deg. 21 min. for the

right ascention desired, which converted into houres, makes 7 houres 17 min. 24 seco. Again, I desire the righ ascention of 20 deg. 40 minutes of Capricorn, whose distance in continuall proceeding from the beginning of Aries, being 290 degrees 40 minutes, taken from 360, leavs 69 degrees 20 minutes, with the Complement whereof 20 degrees 40 minutes and the Complement of the declination of the Sunne upon the same point of the Sunnes place 68 deg. 6 minutes, I work ag followeth.

| | | | | | |
|---|---|---|---|---|---|
| If | 686. | give | 90 | what | 20.40 |
| | 9278 | | 10000 | | 3529. |

Facit, 3803. whose Arch is 22 degrees 21 minutes, the Complement whereof 67 deg. 39 min. taken from 360, leaves 292 deg. 21 min. for the right ascention desired, the same converted into houres, is 19 houres 29 minutes 24 seco.

## The Latitude and Declination of the Sunne known, to finde the difference ascentionall.

### Prop. 6.

As the sine of the Complement of the Latitude is to the sine of the Latitude, so is the sine of the Declination to the quotient found: againe, as the sine of the Complement of the Declination is to the whole sine, so is the said quotient found to the difference ascentionall.

### Example.

I would know the difference ascentionall when the Declination is 20 deg. 6 min. and the Latitude 51 degrees 40 minutes. I say,

| | | | | | |
|---|---|---|---|---|---|
| If | 38.20 | give | 51.40 | what | 20.6 |
| | 6202 | | 7844 | | 3437 |

Facit, 4346, for the quotient found: then again, I say,

| | | | | | |
|---|---|---|---|---|---|
| If | 62.54 | give | 90 | what | |
| | 9391 | | 10000 | | 4346 |

Facit, 4627. whose Arch in the Table of sines 27 deg, 34 min. is the difference ascentionall for the day proposed: the same reduced into houres and minutes, makes one hour and 50 minutes, which taken from six a clock, the hour that the Sunne riseth, being in the Equinoctiall, leaveth four houres ten minutes, at what time the Sunne then riseth, and the said ascentionall difference added to

to 6 a clock, makes 7 a clock 50 minutes, for the Sunne setting.

Again, the said ascensionall difference doubled and added to 12 hours, the time from 6 in the morning till 6 at night, makes 15 hours 40 minutes, for the whole length of the day.

This is when the Sunne hath North declination, for if the declination be South, then the ascensionall difference added to 6 a clock gives the Suns rising, and taken from 6 leaves the setting, and being doubled and taken from 12 houres, leaves the length of the day, as aforesaid.

## The Amplitude and difference ascensionall of the Sunne or Starres given to finde the Declination.

### Prop. 7.

As the sine of the time of the Sunnes rising, converted into degrees and minutes, is to the sine of the complement of the Amplitude, so is the whole sine to the sine of the complement of the Declination.

### Example.

The difference ascensionall being 27 deg. 34 min. shewes the Sunne to rise at 4 a clock 10 minutes, which converted into degrees, makes 62 degr. 30 min. and the Amplitude being found as before is shewed in the third proposition, is 33 degrees 38 minutes, whose the complement thereof 56 degrees 22 minutes. Say then

| | | | | | |
|---|---|---|---|---|---|
| If | 62.30 | give | 56.22 | what | 90 |
| | 8870 | | 8326 | | 10000 |

Facit 9386 whose arch 69 deg. 50 min. the complement thereof 20 degrees 10 minutes is the declination desired.

## The latitude and Declination given, to finde the Meridionall Altitude.

### Prop. 8.

If the Sun have North declination, adde the complement of the Latitude with the declination, the product is the Meridionall Altitude.

### Example.

If the Declination, be 23 deg. 30 min. North, and the Latitude 51 degrees 40 minutes the complement thereof 38 degrees 20 min. added with 23 deg. 30 min. makes 61 degrees 50 minutes

for the Meridian Altitude: but if the Declination be 23 degr. 30 min. South and the Latitude 51 degrees 40 minutes subtract 23 degrees 30 minutes, the Declination from 38 degr. 20. minutes, the complement of the Latitude, and the remainer 14 deg. 50 min. is the altitude desired: and if the Sun be in the Equinoctiall having no Declination, then is the Meridian altitude equall to the complement of the Latitude.

## The Latitude and Declination known, to finde the height of the Sunne at any houre of the day.

### Prop. 9.

FIrst, you are to consider whether the Sun be in the Equinoctiall or whether he hath North or South Declination, for if the Sunne be in the Equinoctiall, then as the whole sine is to the sine of the complement of the Latitude, so is the sine of the complement of the Sunnes distance from noon, allowing 15 deg. for every houre to the sine of the altitude desired.

### Example.

At any time or day, the Sunne then having no Declination, the Latitude 51 deg. 40 min. I desire the Sunnes height at 9 a clock before noon, or at 3 afternoon, the complement of the Latitude is 38 degrees 20 minutes, and the hours distance from noon, 45 degr. whole complement is also 45 deg. Say then

| | | | | | |
|---|---|---|---|---|---|
| If | 90 | give | 38.20. | what | 45. |
| | 10000 | | 6202 | | 7071 |

Facit 4385 whole arch 26 deg. is the height of the Sun above the horizon, the time and place proposed.

If the Sun have Declination, then is the working somewhat more, except onely at 6 a clock either before or after noon: for which hour, as the whole sine is to the sine of the Latitude, so is the sine of the Declination to the sine of the Altitude.

### Example.

The Latitude being 51 deg. 40 min, and the Declination 11 deg. 48 min. Say.

| | | | | | |
|---|---|---|---|---|---|
| If | 90 | give | 55.40 | what | 11.48 |
| | 10000 | | 7844 | | 2045 |

Facit 1604 whole arch 9 deg. 14 minutes is the Altitude desired.

But

But for any other hour of the Day worke as followeth: If it be in the forenoon subtract the hour given out of 12 houres, and reduce the remainer into Degrées, and if the remainer be lesse then 6 hours, séek the sine complement of it, and subtract it out of 10000 and kéep the remainer, but if the former remaine be more then 6 houres subtract 6 houres from it, and kéepe the sine of the remainer and adde it to 10000 and kéepe the summe: Then multiply the first remainer kept, or this last sum kept, by the sine of the complement of the Declination, cutting off 4 figures to the right hand from the Product, and multiply the Product by the sine of the Complement of the Latitude, cutting off also 4 figures from the right hand from the Product, and this last Product subtract from the sine of the Meridian Altitude of the Sunne, and the remainer is the sine of the Sunns Altitude required.

You are to note, if the Houre given be afternoon, you must take the houre given it self, and observe as before, whether it be more or lesse then 6 hours.

Example.

Any Day or Yére at 9 of the clock Latitude 51 deg. 30 min. Declination 11 deg. 43 min. North, subtract 9 from 12, the remainer is 3, that being reduced is 45 deg. 0 min. whose sine complement is 7071, which subtracted from 10000, the remainer is 2929, which multiplyed by 9791 the sine complement of the Declination 78 deg. 17 min. the Product is 2867, and this product multiplyed by 6225, the sine complement of the Latitude; the last Product is 1784. Now the Meridian Altitude is 50 deg. 13 min. whose sine is 7685, from which subtract the former number, the remainer is 5901, the sine of 36 degrées 9 minutes the Sunnes Altitude required.

## To finde the Sunnes Azimuth having the Declination and Altitude of the Sunne, and the height of the Pole given.

### Prop. 10.

ADde the Complement of the Latitude to the Sunnes Altitude, and from the sine of that summe, subtract the sine of the

the Sunnes Declination, and keep the remainer, when the Sun hath North Declination; but if the Sunne have South declination, adde the sine of the Declination, to the sine of that summe, and keep the whole summe, which remainer or summe, multiply by 10000 for the dividend, and multiply the sine of the Complement of the Sunnes altitude by the sine of the complement of the Latitude for the Devisor cutting off 4 figures to the right hand from the Product, by which Devisor, divide the former dividend, and if the Quottient be lesse than 10000, substract it from 10000, and the remainer is the sine of the Azimuth from the East or West Northwards: but if the Quottient be more than 10000, substract 10000, from it, and the remainer is the sine of the Azimuth from the East or West Southwards.

Note, if the Sunne have no declination, then the sine of the summe of the Sunnes Altitude, and the complement of the Latitude, must be multiplyed by 10000 for the dividend, and the divisor must be as before.

Example.

The Sunne having 13 degrees 0 min. North declination in Latitude 51 degr. 30 min. being 43 deg. 0 min. high in the fore-noon, I demand the Azimuth. The summe of the Sunnes altitude, and the Complement of the Latitude 81 deg. 30 min. the sine 9890. and the sine of the declination 2249, the difference 7644. which multiplyed by 10000, for the dividend, is 76440000, the sine of the Complement of the Altitude is 7313, which multiplyed by 6225 the sine of the Complement of the Latitude, the Product is 4552 for the divisor of the Quottient is 16786, from which 10000 substracted, the remainer is 6789, the sine of 42 deg. 44 min. the Suns Azimuth from the East Southwards.

## The Latitude given, to finde how many Minutes or Miles of the Æquinoctiall makes a degree of Longitude in any Parallel.

### Prop. 11.

AS the whole sine is in proportion to 60, so is the sine of the complement of the Latitude to the miles answerable to a degree in the Latitude desired.

I desire to know how many miles in running East or West in the Latitude of 51 deg. 40 min. will alter one degree of Longitude? Say.

| | | | | |
|---|---|---|---|---|
| If | 90 | give | 60 | what 38.20 |
| | 10000 | | | 6202 |

Facit 37 for the number of Miles answrable to a degree in the Latitude desired.

The Course and Distance given, to finde out the Difference of Latitude.

Prop. 12.

As the whole sine is to the Miles of way run, so is the sine of the Courses distance from East or West, to the minutes of difference of Latitude.

Example.

Running West Southwest, which is 22 deg. 30 minutes from the West 75 leagues, or 225 miles, I demand the difference of Latitude? Say:

| | | | | |
|---|---|---|---|---|
| If | 90 | give | 225 | what 22.30 |
| | 10000 | | | 3827 |

Facit, 86 minutes, or one degree 26 minutes for the difference of Latitude upon the said Course and distance.

By Course and Distance given, to finde the Difference of Longitude.

Prop. 13.

As the whole sine is to the Miles of way that you have runne, so is the sine of the degree that your course is distant from South or North, to the miles that you are departed from your first Meridian.

Exnmple.

Running Northwest and by North, which is 33 deg. 45 minutes from the North 60 leagues or 180 miles, I demand the difference of Longitude? Say.

| | | | | |
|---|---|---|---|---|
| If | 90 | give | 180 | what 33.45 |
| | 10000 | | | 5556 |

Facit 100 miles, which you are departed from the Meridian to the Westward, which if you divide by the number of miles answerable

table to a degree of Longitude, in the Latitude where you then finde your ſelf to be, the Quotient gives you the deg. and min. of the difference of Longitude.

## By the diſtance and departure from the Meridian given, to finde the Courſe.

### Prop. 14.

AS the Miles of diſtance that you have run, is in proportion to the whole line, ſo is the Miles of your departure from the Meridian to the line of your Courſe from South or North.

### Example.

Being departed from the firſt Meridian 75 miles in the running of 50 leagues or 150 miles, I demand upon what point I have ſailed, it being betwixt South and Weſt:

| | | | | |
|---|---|---|---|---|
| If | 150 | give | 10000 | what 75 |

Facit 5000, whoſe Arch 30 deg. is the diſtance from South towards Weſt, that the Courſe is, which is South-weſt and by South Southerly.

## The Latitude, Declination, and height of the Sunne given, to know the houre of the day.

### Prop. 15.

SUbtract the line of the Sunnes Altitude given out of the line of the Sunnes Meridian Altitude (you may finde the Meridian Altitude by the eighth Propoſition fore-going) and multiply the remainer by 10000 for the Dividend and multiply the line of the complement of the Sunnes Declination by the line of the Complement of the Latitude for the deviſor, by which diviſor divide the former dividend, & if the Quotient be more than 10000 ſubtract 10000 from it and the remainer is the line of the houre wanting of 6 in the Fore-noon, or the houre paſt 6 in the Afternoon, but if the Quotient be leſſe then 10000, ſubtract it from 10000 and the remainer is the line of the houre paſt 6 in the forenoon, or wanting of 6 in the afternoon.

Example

### Example.

In Latitude 51 deg. 30 min. the Declination 15 deg. 0 min. North, the Altitude 43 d. 0 m. in the forenoon, I demand the houre of the day. The Meridian altitude 53 deg. 30 min. the sine 8038, and the Sine of the Altitude given 6820, the difference 1218, which multiplyed by 10000, is 12180000 for the Dividend, the Sine of the complement of the Declination 9659. which multiplyed by 6225. the sine of the Complement of the Latitude, the Product is 6012 for the Divisor, and the Quottient is 2025, which subtracted from 10000, the remainer is 7975, the sine of 52 deg. 53 min. the hour past 6, in the Morning, which being reduced is 3 hours, 31½ minutes, and added to 6, makes 9 of the clock and 31½ minutes the houre of the Day.

## To finde the Sinus versus of any given Arch.

### Prop. 16.

IF the Arch given be lesse then 90, subtract it from 90, and the Sine of the remainer taken from the totall sine, leaves the Sinus versus; but if the given Arch be greater then 90 deg. subtract 90 deg. there-from, and seek the Sine of the remainer, which is always the Complement of the given Arch: which Sinus adde to the whole Sine, and the totall thereof is the Sinus versus, of the given arch desired.

### Example.

To know the Sinus versus of 47 degrees 12 minutes, the complement thereof is 42 degrees 48 minutes, whose sine 6794 taken from 10000, the whole sine resteth 3206, the reversed sine of 47 deg. 12 minutes.

Likewise: to know the reversed sine of 137 deg. 25 minutes, which is more than 90 degrees, taking 90 there-from, there resteth 47 degrees 25 minutes, the Sinus whereof 7363 added to the whole Sine, maketh 17363 for the reversed Sine of 137 degrees, 25 minutes.

# A Table of SINES.

## The Degrees of the Quadrant.

| M | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 3 | 177 | 352 | 526 | 700 | 874 | 1048 | 1222 | 1395 | 1567 |
| 2 | 6 | 180 | 355 | 529 | 703 | 877 | 1051 | 1224 | 1398 | 1570 |
| 3 | 9 | 183 | 358 | 532 | 706 | 880 | 1054 | 1227 | 1400 | 1573 |
| 4 | 12 | 186 | 361 | 535 | 709 | 883 | 1057 | 1230 | 1403 | 1576 |
| 5 | 14 | 189 | 362 | 538 | 712 | 886 | 1060 | 1233 | 1406 | 1579 |
| 6 | 17 | 192 | 366 | 541 | 715 | 889 | 1063 | 1236 | 1409 | 1582 |
| 7 | 20 | 195 | 369 | 544 | 718 | 892 | 1065 | 1239 | 1412 | 1584 |
| 8 | 23 | 198 | 372 | 547 | 721 | 895 | 1068 | 1242 | 1415 | 1587 |
| 9 | 26 | 201 | 375 | 549 | 724 | 898 | 1071 | 1245 | 1418 | 1590 |
| 10 | 29 | 204 | 378 | 552 | 726 | 900 | 1074 | 1247 | 1421 | 1593 |
| 11 | 32 | 206 | 381 | 555 | 729 | 903 | 1077 | 1250 | 1424 | 1596 |
| 12 | 35 | 209 | 384 | 558 | 732 | 906 | 1080 | 1253 | 1426 | 1599 |
| 13 | 38 | 212 | 387 | 561 | 735 | 909 | 1083 | 1256 | 1429 | 1602 |
| 14 | 41 | 215 | 390 | 564 | 738 | 912 | 1086 | 1259 | 1432 | 1605 |
| 15 | 44 | 218 | 393 | 567 | 741 | 915 | 1089 | 1262 | 1435 | 1608 |
| 16 | 46 | 221 | 395 | 570 | 744 | 918 | 1091 | 1265 | 1438 | 1610 |
| 17 | 49 | 224 | 398 | 573 | 747 | 921 | 1094 | 1268 | 1441 | 1613 |
| 18 | 52 | 227 | 401 | 576 | 750 | 924 | 1097 | 1271 | 1444 | 1616 |
| 19 | 55 | 230 | 404 | 578 | 753 | 927 | 1100 | 1273 | 1446 | 1619 |
| 20 | 58 | 233 | 407 | 581 | 756 | 930 | 1103 | 1276 | 1449 | 1622 |
| 21 | 61 | 235 | 410 | 584 | 758 | 932 | 1106 | 1279 | 1452 | 1625 |
| 22 | 64 | 238 | 413 | 587 | 761 | 935 | 1109 | 1282 | 1455 | 1627 |
| 23 | 67 | 241 | 416 | 590 | 764 | 938 | 1112 | 1285 | 1458 | 1630 |
| 24 | 70 | 244 | 419 | 593 | 767 | 941 | 1115 | 1288 | 1461 | 1633 |
| 25 | 73 | 247 | 422 | 596 | 770 | 944 | 1118 | 1291 | 1464 | 1636 |
| 26 | 76 | 250 | 425 | 599 | 773 | 947 | 1120 | 1294 | 1467 | 1639 |
| 27 | 78 | 253 | 427 | 602 | 776 | 950 | 1123 | 1297 | 1469 | 1642 |
| 28 | 81 | 256 | 430 | 605 | 779 | 953 | 1126 | 1299 | 1472 | 1645 |
| 29 | 84 | 259 | 433 | 608 | 782 | 956 | 1129 | 1302 | 1475 | 1648 |
| 30 | 87 | 262 | 436 | 610 | 785 | 959 | 1132 | 1305 | 1478 | 1650 |

# A Table of SINES.

## The Degrees of the Quadrant.

| M. | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|---|
| 31 | 90 | 265 | 439 | 613 | 787 | 961 | 1135 | 1308 | 1481 | 1653 |
| 32 | 93 | 268 | 442 | 616 | 790 | 964 | 38 | 11 | 84 | 56 |
| 33 | 96 | 270 | 445 | 619 | 793 | 967 | 41 | 14 | 87 | 59 |
| 34 | 99 | 273 | 448 | 622 | 796 | 970 | 44 | 17 | 90 | 62 |
| 35 | 102 | 276 | 451 | 625 | 799 | 973 | 46 | 20 | 92 | 65 |
| 36 | 105 | 279 | 454 | 628 | 802 | 976 | 49 | 22 | 95 | 68 |
| 37 | 107 | 282 | 456 | 631 | 805 | 979 | 52 | 25 | 98 | 70 |
| 38 | 110 | 285 | 459 | 634 | 808 | 982 | 55 | 28 | 1501 | 73 |
| 39 | 113 | 288 | 462 | 637 | 811 | 985 | 58 | 31 | 04 | 76 |
| 40 | 116 | 291 | 465 | 640 | 814 | 988 | 61 | 34 | 07 | 79 |
| 41 | 119 | 294 | 468 | 642 | 816 | 990 | 64 | 37 | 10 | 82 |
| 42 | 122 | 297 | 471 | 645 | 819 | 993 | 67 | 40 | 13 | 85 |
| 43 | 125 | 300 | 474 | 648 | 822 | 996 | 70 | 43 | 15 | 88 |
| 44 | 128 | 302 | 477 | 651 | 825 | 999 | 72 | 46 | 18 | 91 |
| 45 | 131 | 305 | 480 | 654 | 828 | 1002 | 75 | 48 | 21 | 93 |
| 46 | 134 | 308 | 483 | 657 | 831 | 1005 | 78 | 51 | 24 | 96 |
| 47 | 137 | 311 | 485 | 660 | 834 | 1008 | 81 | 54 | 27 | 99 |
| 48 | 240 | 314 | 488 | 663 | 837 | 1010 | 84 | 57 | 30 | 1702 |
| 49 | 142 | 317 | 491 | 666 | 840 | 1013 | 87 | 60 | 33 | 05 |
| 50 | 145 | 320 | 494 | 668 | 843 | 1016 | 90 | 63 | 36 | 08 |
| 51 | 148 | 323 | 497 | 671 | 845 | 1019 | 93 | 66 | 38 | 11 |
| 52 | 151 | 326 | 500 | 674 | 848 | 1022 | 96 | 69 | 41 | 14 |
| 53 | 154 | 329 | 503 | 677 | 851 | 1025 | 98 | 72 | 44 | 16 |
| 54 | 157 | 331 | 506 | 680 | 854 | 1028 | 1201 | 74 | 47 | 19 |
| 55 | 160 | 334 | 509 | 683 | 857 | 1031 | 04 | 77 | 50 | 22 |
| 56 | 163 | 337 | 512 | 686 | 860 | 1034 | 07 | 80 | 53 | 25 |
| 57 | 166 | 340 | 515 | 689 | 863 | 1037 | 10 | 83 | 56 | 28 |
| 58 | 169 | 343 | 517 | 692 | 866 | 1039 | 13 | 86 | 59 | 31 |
| 59 | 172 | 347 | 520 | 695 | 869 | 1042 | 16 | 89 | 61 | 34 |
| 60 | 174 | 350 | 523 | 697 | 871 | 1045 | 19 | 92 | 64 | 36 |

# A Table of SINES.

## The Degrees of the Quadrant.

| M. | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1739 | 1911 | 2082 | 2252 | 2422 | 2591 | 2759 | 2926 | 3093 | 3258 |
| 2 | 1742 | 1914 | 2085 | 2255 | 2425 | 2594 | 2762 | 2929 | 3096 | 3261 |
| 3 | 1745 | 1917 | 2088 | 2258 | 2428 | 2597 | 2765 | 2932 | 3098 | 3264 |
| 4 | 1748 | 1919 | 2090 | 2261 | 2330 | 2599 | 2767 | 2935 | 3101 | 3267 |
| 5 | 1751 | 1922 | 2093 | 2264 | 2433 | 2602 | 2770 | 2938 | 3104 | 3269 |
| 6 | 1754 | 1925 | 2096 | 2267 | 2436 | 2605 | 2773 | 2940 | 3107 | 3272 |
| 7 | 1756 | 1928 | 2099 | 2269 | 2439 | 2608 | 2776 | 2943 | 3109 | 3275 |
| 8 | 1759 | 1931 | 2102 | 2272 | 2442 | 2611 | 2779 | 2946 | 3112 | 3278 |
| 9 | 1762 | 1934 | 2105 | 2275 | 2445 | 2613 | 2781 | 2949 | 3115 | 3280 |
| 10 | 1765 | 1937 | 2107 | 2278 | 2447 | 2616 | 2784 | 2951 | 3118 | 3283 |
| 11 | 1768 | 1939 | 2110 | 2281 | 2450 | 2619 | 2787 | 2954 | 3120 | 3286 |
| 12 | 1771 | 1942 | 2113 | 2283 | 2453 | 2622 | 2790 | 2957 | 3123 | 3289 |
| 13 | 1773 | 1945 | 2117 | 2286 | 2456 | 2625 | 2793 | 2960 | 3126 | 3291 |
| 14 | 1776 | 1948 | 2119 | 2289 | 2459 | 2628 | 2795 | 2963 | 3129 | 3294 |
| 15 | 1779 | 1951 | 2122 | 2292 | 2462 | 2630 | 2798 | 2965 | 3132 | 3297 |
| 16 | 1782 | 1954 | 2125 | 2295 | 2464 | 2633 | 2801 | 2968 | 3134 | 3300 |
| 17 | 1785 | 1957 | 2127 | 2298 | 2467 | 2636 | 2804 | 2971 | 3137 | 3302 |
| 18 | 1788 | 1959 | 2130 | 2300 | 2470 | 2639 | 2807 | 2974 | 3140 | 3305 |
| 19 | 1790 | 1962 | 2133 | 2303 | 2473 | 2641 | 2809 | 2976 | 3143 | 3308 |
| 20 | 1793 | 1965 | 2136 | 2306 | 2476 | 2644 | 2812 | 2979 | 3146 | 3311 |
| 21 | 1796 | 1968 | 2139 | 2309 | 2478 | 2647 | 2815 | 2982 | 3148 | 3313 |
| 22 | 1799 | 1971 | 2142 | 2312 | 2481 | 2650 | 2818 | 2985 | 3151 | 3316 |
| 23 | 1802 | 1974 | 2145 | 2315 | 2484 | 2653 | 2821 | 2988 | 3154 | 3319 |
| 24 | 1805 | 1977 | 2147 | 2317 | 2487 | 2655 | 2823 | 2990 | 3156 | 3322 |
| 25 | 1808 | 1979 | 2150 | 2320 | 2490 | 2658 | 2826 | 2993 | 3159 | 3324 |
| 26 | 1810 | 1982 | 2153 | 2323 | 2492 | 2661 | 2829 | 2996 | 3162 | 3327 |
| 27 | 1813 | 1985 | 2156 | 2326 | 2495 | 2664 | 2832 | 2999 | 3165 | 3330 |
| 28 | 1816 | 1988 | 2159 | 2329 | 2498 | 2667 | 2835 | 3001 | 3167 | 3333 |
| 29 | 1819 | 1991 | 2161 | 2331 | 2501 | 2669 | 2837 | 3004 | 3170 | 3335 |
| 30 | 1822 | 1994 | 2164 | 2334 | 2504 | 2672 | 2840 | 3007 | 3173 | 3338 |

# A Table of SINES.

## The Degrees of the Quadrant.

| M. | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 |
|---|---|---|---|---|---|---|---|---|---|---|
| 31 | 1825 | 1996 | 2167 | 2337 | 2507 | 2675 | 2843 | 3010 | 3176 | 3341 |
| 32 | 1828 | 1999 | 2170 | 2340 | 2509 | 2678 | 2846 | 3013 | 3178 | 3343 |
| 33 | 1830 | 2002 | 2173 | 2343 | 2512 | 2681 | 2848 | 3015 | 3181 | 3346 |
| 34 | 1833 | 2005 | 2176 | 2346 | 2515 | 2683 | 3851 | 3018 | 3184 | 3349 |
| 35 | 1836 | 2008 | 2178 | 2349 | 2518 | 2686 | 2854 | 3021 | 3187 | 3352 |
| 36 | 1839 | 2011 | 2181 | 2351 | 2521 | 2689 | 2857 | 3024 | 3189 | 3354 |
| 37 | 1842 | 2014 | 2184 | 2354 | 2524 | 2692 | 2860 | 3026 | 3192 | 3357 |
| 38 | 1846 | 2016 | 2187 | 2357 | 2526 | 2695 | 2862 | 3029 | 3195 | 3360 |
| 39 | 1848 | 2019 | 2190 | 2360 | 2529 | 2698 | 2865 | 3032 | 3198 | 3363 |
| 40 | 1850 | 2022 | 2193 | 2363 | 2532 | 2700 | 2868 | 3035 | 3201 | 3365 |
| 41 | 1853 | 2025 | 2196 | 2365 | 2535 | 2703 | 2871 | 3037 | 3203 | 3368 |
| 42 | 1856 | 2028 | 2198 | 2368 | 2538 | 2706 | 2874 | 3040 | 3206 | 3371 |
| 43 | 1859 | 2031 | 2201 | 2371 | 2540 | 2709 | 2876 | 3043 | 3209 | 3374 |
| 44 | 1862 | 2034 | 2204 | 2374 | 2543 | 2712 | 2879 | 3046 | 3212 | 3376 |
| 45 | 1865 | 2036 | 2207 | 2377 | 2546 | 2714 | 2882 | 3049 | 3214 | 3379 |
| 46 | 1868 | 2039 | 2210 | 2380 | 2549 | 2717 | 2885 | 3051 | 3217 | 3382 |
| 47 | 1870 | 2042 | 2213 | 2382 | 2552 | 2720 | 2887 | 3054 | 3220 | 3385 |
| 48 | 1873 | 2045 | 2216 | 2385 | 2555 | 2723 | 2890 | 3057 | 3223 | 3387 |
| 49 | 1876 | 2048 | 2218 | 2388 | 2557 | 2726 | 2893 | 3060 | 3225 | 3390 |
| 50 | 1879 | 2051 | 2221 | 2391 | 2560 | 2728 | 2896 | 3062 | 3228 | 3393 |
| 51 | 1882 | 2053 | 2224 | 2394 | 2563 | 2731 | 2899 | 3065 | 3231 | 3396 |
| 52 | 1885 | 2056 | 2227 | 2397 | 2566 | 2734 | 2901 | 3068 | 3234 | 3398 |
| 53 | 1888 | 2059 | 2230 | 2399 | 2568 | 2737 | 2904 | 3071 | 3236 | 3301 |
| 54 | 1891 | 2062 | 2231 | 2402 | 2571 | 2740 | 2907 | 3073 | 3239 | 3404 |
| 55 | 1894 | 2065 | 2235 | 2405 | 2574 | 2742 | 2910 | 3076 | 3242 | 3406 |
| 56 | 1896 | 2068 | 2238 | 2409 | 2577 | 2745 | 2913 | 3079 | 3245 | 3409 |
| 57 | 1899 | 2070 | 2241 | 2411 | 2580 | 2748 | 2915 | 3082 | 3247 | 4312 |
| 58 | 1902 | 2073 | 2244 | 2414 | 2583 | 2751 | 2918 | 3085 | 3250 | 3415 |
| 59 | 1905 | 2076 | 2247 | 2416 | 2585 | 2754 | 2921 | 3987 | 3253 | 3417 |
| 60 | 1908 | 2079 | 2249 | 2419 | 2588 | 2756 | 2924 | 3090 | 3256 | 3420 |

# A Table of SINES.

## The Degrees of the Quadrant.

| M. | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 3423 | 3586 | 3749 | 3910 | 4070 | 4229 | 4386 | 4542 | 4697 | 4851 |
| 2 | 3426 | 3589 | 3751 | 3913 | 4073 | 4231 | 4389 | 4545 | 4700 | 4853 |
| 3 | 3428 | 3592 | 3754 | 3915 | 4075 | 4234 | 4391 | 4548 | 4702 | 4856 |
| 4 | 3431 | 3594 | 3757 | 3918 | 4078 | 4237 | 4394 | 4550 | 4705 | 4858 |
| 5 | 3434 | 3597 | 3759 | 3921 | 4081 | 4239 | 4396 | 4553 | 4707 | 4861 |
| 6 | 3437 | 3600 | 3762 | 3923 | 4083 | 4242 | 4399 | 4555 | 4710 | 4863 |
| 7 | 3439 | 3603 | 3765 | 3926 | 4086 | 4245 | 4402 | 4558 | 4713 | 4866 |
| 8 | 3442 | 3605 | 3768 | 3929 | 4089 | 4247 | 4404 | 4561 | 4715 | 4868 |
| 9 | 3445 | 3608 | 3770 | 3931 | 4091 | 4250 | 4407 | 4563 | 4718 | 4871 |
| 10 | 3447 | 3611 | 3773 | 3934 | 4094 | 4252 | 4410 | 4566 | 4720 | 4873 |
| 11 | 3450 | 3613 | 3776 | 3937 | 4096 | 4255 | 4412 | 4568 | 4723 | 4876 |
| 12 | 3453 | 3616 | 3778 | 3939 | 4099 | 4258 | 4415 | 4571 | 4725 | 4878 |
| 13 | 3456 | 3619 | 3781 | 3942 | 4102 | 4260 | 4418 | 4573 | 4728 | 4881 |
| 14 | 3458 | 3622 | 3784 | 3945 | 4104 | 4263 | 4420 | 4576 | 4731 | 4883 |
| 15 | 3461 | 3624 | 3786 | 3947 | 4107 | 4266 | 4423 | 4579 | 4733 | 4886 |
| 16 | 3464 | 3627 | 3789 | 3950 | 4110 | 4268 | 4425 | 4581 | 4736 | 4888 |
| 17 | 3467 | 3630 | 3792 | 3953 | 4112 | 4271 | 4428 | 4584 | 4738 | 4891 |
| 18 | 3469 | 3632 | 3794 | 3955 | 4115 | 4274 | 4431 | 4586 | 4741 | 4893 |
| 19 | 3472 | 3635 | 3797 | 3958 | 4118 | 4276 | 4433 | 4589 | 4743 | 4896 |
| 20 | 3475 | 3638 | 3800 | 3961 | 4120 | 4279 | 4436 | 4592 | 4746 | 4898 |
| 21 | 3477 | 3641 | 3802 | 3962 | 4123 | 4281 | 4438 | 4594 | 4748 | 4901 |
| 22 | 3480 | 3643 | 3805 | 3966 | 4126 | 4284 | 4441 | 4597 | 4751 | 4904 |
| 23 | 3483 | 3646 | 3808 | 3969 | 4128 | 4287 | 4444 | 4599 | 4754 | 4906 |
| 24 | 3486 | 3649 | 3811 | 3971 | 4131 | 4289 | 4446 | 4602 | 4756 | 4909 |
| 25 | 3488 | 3651 | 3813 | 3974 | 4134 | 4292 | 4449 | 4604 | 4759 | 4911 |
| 26 | 3491 | 3654 | 3816 | 3977 | 4136 | 4295 | 4451 | 4607 | 4761 | 4914 |
| 27 | 3494 | 3657 | 3819 | 3979 | 4139 | 4297 | 4454 | 4610 | 4764 | 4916 |
| 28 | 3497 | 3660 | 3821 | 3982 | 4142 | 4300 | 4457 | 4612 | 4766 | 4919 |
| 29 | 3499 | 3662 | 3824 | 3985 | 4144 | 4302 | 4459 | 4615 | 4769 | 4921 |
| 30 | 3502 | 3665 | 3827 | 3987 | 4147 | 4305 | 4462 | 4617 | 4771 | 4924 |

# A Table of SINES.

## The Degrees of the Quadrant.

| M. | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 |
|---|---|---|---|---|---|---|---|---|---|---|
| 31 | 3505 | 3668 | 3829 | 3990 | 4149 | 4308 | 4464 | 4620 | 4774 | 4927 |
| 32 | 3507 | 3670 | 3832 | 3993 | 4152 | 4310 | 4[illegible] | 4623 | 4777 | 4929 |
| 33 | 3510 | 3673 | 3835 | 3995 | 4155 | 4313 | 4470 | 4625 | 4779 | 4932 |
| 34 | 3513 | 3676 | 3837 | 3998 | 4157 | 4316 | 4472 | 4628 | 4782 | 4934 |
| 35 | 3516 | 3679 | 3840 | 4001 | 4160 | 4318 | 4475 | 4630 | 4784 | 4937 |
| 36 | 3518 | 3681 | 3843 | 4003 | 4163 | 4321 | 4478 | 4633 | 4787 | 4939 |
| 37 | 3521 | 3684 | 3846 | 4006 | 4165 | 4324 | 4480 | 4635 | 4789 | 4942 |
| 38 | 3524 | 3687 | 3848 | 4009 | 4168 | 4326 | 4483 | 4638 | 4792 | 4944 |
| 39 | 3527 | 3689 | 3851 | 4011 | 4171 | 4329 | 4485 | 4641 | 4794 | 4947 |
| 40 | 3529 | 3692 | 3854 | 4014 | 4173 | 4331 | 4488 | 4643 | 4797 | 4949 |
| 41 | 3532 | 3695 | 3856 | 4017 | 4176 | 4334 | 4490 | 4646 | 4799 | 4952 |
| 42 | 3535 | 3697 | 3859 | 4019 | 4178 | 4336 | 4493 | 4648 | 4802 | 4954 |
| 43 | 3537 | 3700 | 3862 | 4022 | 4181 | 4339 | 4496 | 4651 | 4805 | 4957 |
| 44 | 3540 | 3703 | 3864 | 4025 | 4184 | 4342 | 4498 | 4653 | 4807 | 4960 |
| 45 | 3543 | 3706 | 3867 | 4028 | 1486. | 4344 | 4501 | 4656 | 4810 | 4962 |
| 46 | 3546 | 3708 | 3870 | 4030 | 4189 | 4347 | 4503 | 4659 | 4812 | 4965 |
| 47 | 3548 | 3711 | 3872 | 4033 | 4192 | 4350 | 4506 | 4661 | 4815 | 4967 |
| 48 | 3551 | 3714 | 3875 | 4035 | 4194 | 4352 | 4509 | 4664 | 4817 | 4970 |
| 49 | 3554 | 3716 | 3878 | 4038 | 4197 | 4355 | 4511 | 4666 | 4820 | 4972 |
| 50 | 3556 | 3719 | 3880 | 4041 | 4200 | 4357 | 4514 | 4669 | 4822 | 4975 |
| 51 | 3559 | 3722 | 3883 | 4043 | 4202 | 4360 | 4516 | 4671 | 4825 | 4977 |
| 52 | 3562 | 3724 | 3886 | 4046 | 4205 | 4363 | 4519 | 4674 | 4828 | 4980 |
| 53 | 3565 | 3727 | 3888 | 4049 | 4208 | 4365 | 4522 | 4677 | 4830 | 4982 |
| 54 | 3567 | 3730 | 3891 | 4051 | 4210 | 4368 | 4524 | 4679 | 4833 | 4985 |
| 55 | 3570 | 3732 | 3894 | 4054 | 4213 | 4371 | 4527 | 4682 | 4835 | 4987 |
| 56 | 3573 | 3735 | 3896 | 4057 | 4216 | 4373 | 4529 | 4684 | 4838 | 4990 |
| 57 | 3575 | 3738 | 3899 | 4059 | 4218 | 4376 | 4532 | 4687 | 4840 | 4992 |
| 58 | 3578 | 3741 | 3902 | 4062 | 4221 | 4378 | 4535 | 4689 | 4843 | 4995 |
| 59 | 3581 | 3743 | 3905 | 4065 | 4224 | 4381 | 4537 | 4692 | 4845 | 4997 |
| 60 | 3584 | 3746 | 3908 | 4067 | 4226 | 4384 | 4540 | 4695 | 4848 | 500 |

# A Table of SINES.

## The Degrees of the Quadrant.

| Min. | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 |
|---|---|---|---|---|---|---|---|---|
| 1 | 5002 | 5153 | 5302 | 5449 | 5594 | 5738 | 5880 | 6020 |
| 2 | 5005 | 5155 | 5304 | 5451 | 5597 | 5740 | 5882 | 6023 |
| 3 | 5007 | 5158 | 5306 | 5454 | 5599 | 5743 | 5885 | 6025 |
| 4 | 5010 | 5160 | 5309 | 5456 | 5601 | 5745 | 5887 | 6027 |
| 5 | 5012 | 5163 | 5311 | 5458 | 5604 | 5748 | 5890 | 6030 |
| 6 | 5015 | 5165 | 5314 | 5461 | 5606 | 5750 | 5892 | 6032 |
| 7 | 5017 | 5168 | 5316 | 5463 | 5609 | 5752 | 5894 | 6034 |
| 8 | 5020 | 5170 | 5319 | 5466 | 5611 | 5755 | 5896 | 6037 |
| 9 | 5022 | 5173 | 5321 | 5468 | 5614 | 5757 | 5899 | 6839 |
| 10 | 5025 | 5175 | 5324 | 5471 | 5616 | 5359 | 5901 | 6041 |
| 11 | 5027 | 5178 | 5326 | 5473 | 5618 | 5762 | 5904 | 6044 |
| 12 | 5030 | 5180 | 5329 | 5476 | 5621 | 5764 | 5906 | 6046 |
| 13 | 5032 | 5183 | 5331 | 5478 | 5623 | 5767 | 5909 | 6048 |
| 14 | 5035 | 5185 | 5334 | 5480 | 5625 | 5769 | 5911 | 6051 |
| 15 | 5038 | 5188 | 5336 | 5483 | 5628 | 5771 | 5913 | 6053 |
| 16 | 5040 | 5190 | 5339 | 5485 | 5630 | 5774 | 5915 | 6055 |
| 17 | 5042 | 5193 | 5341 | 5488 | 5633 | 5776 | 5918 | 6057 |
| 18 | 5045 | 5195 | 5343 | 5490 | 5635 | 5778 | 5920 | 6060 |
| 19 | 5048 | 5198 | 5346 | 5493 | 5638 | 5781 | 5922 | 6062 |
| 20 | 5050 | 5200 | 5348 | 5495 | 5640 | 5783 | 5925 | 6064 |
| 21 | 5053 | 5203 | 5351 | 5497 | 5642 | 5785 | 5927 | 6067 |
| 22 | 5055 | 5205 | 5353 | 5500 | 5645 | 5788 | 5929 | 6069 |
| 23 | 5058 | 5208 | 5356 | 5502 | 5647 | 5790 | 5932 | 6071 |
| 24 | 5060 | 5210 | 5358 | 5505 | 5650 | 5793 | 5934 | 6074 |
| 25 | 5063 | 5212 | 5361 | 5507 | 5652 | 5795 | 5936 | 6076 |
| 26 | 5065 | 5215 | 5363 | 5509 | 5654 | 5797 | 5939 | 6078 |
| 27 | 5068 | 5217 | 5366 | 5512 | 5657 | 5800 | 5941 | 6081 |
| 28 | 5070 | 5220 | 5368 | 5514 | 5659 | 5802 | 5943 | 6083 |
| 29 | 5073 | 5222 | 5370 | 5517 | 5662 | 5805 | 5946 | 6085 |
| 30 | 5075 | 5225 | 5373 | 5519 | 5664 | 5807 | 5948 | 6088 |

# A Table of SINES.

## The Degrees of the Quadrant.

| Min. | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 |
|---|---|---|---|---|---|---|---|---|
| 31 | 5078 | 5227 | 5375 | 5522 | 5666 | 5809 | 5950 | 9090 |
| 32 | 5080 | 5230 | 5378 | 5524 | 5669 | 5812 | 5953 | 6092 |
| 33 | 5083 | 3232 | 5380 | 5527 | 5671 | 5814 | 5955 | 6094 |
| 34 | 5085 | 5235 | 5383 | 5529 | 5674 | 5816 | 5957 | 6097 |
| 35 | 5088 | 5237 | 5385 | 5531 | 5676 | 5819 | 5960 | 6099 |
| 36 | 5090 | 5240 | 5388 | 5534 | 5678 | 5821 | 5962 | 6101 |
| 37 | 5093 | 5242 | 5390 | 5536 | 5681 | 5823 | 5964 | 6104 |
| 38 | 5095 | 5245 | 5393 | 5539 | 5683 | 5826 | 5967 | 6106 |
| 39 | 5098 | 5247 | 5395 | 5541 | 5685 | 5828 | 5969 | 6168 |
| 40 | 5100 | 5250 | 5397 | 5543 | 5688 | 5831 | 5971 | 6111 |
| 41 | 5103 | 5252 | 5400 | 5546 | 5690 | 5833 | 5974 | 6113 |
| 42 | 5105 | 5255 | 5402 | 5548 | 5693 | 5835 | 5976 | 6115 |
| 43 | 5108 | 5257 | 5404 | 5551 | 5695 | 5838 | 5978 | 6117 |
| 44 | 5110 | 5260 | 5407 | 5553 | 5697 | 5840 | 5981 | 6120 |
| 45 | 5113 | 5262 | 5410 | 5556 | 5700 | 5842 | 5983 | 6122 |
| 46 | 5115 | 5265 | 5412 | 5558 | 5702 | 5845 | 5985 | 6124 |
| 47 | 5118 | 5267 | 5415 | 5560 | 5705 | 5847 | 5988 | 6127 |
| 48 | 5120 | 5269 | 5417 | 5563 | 5707 | 5849 | 5990 | 6129 |
| 49 | 5123 | 5272 | 5419 | 5565 | 5709 | 5852 | 5992 | 6131 |
| 50 | 5127 | 5274 | 5422 | 5568 | 5712 | 5854 | 5995 | 6134 |
| 51 | 5128 | 5277 | 5424 | 5570 | 5714 | 5856 | 5997 | 6136 |
| 52 | 5130 | 5279 | 5427 | 5573 | 5717 | 5859 | 5999 | 6138 |
| 53 | 5133 | 5282 | 5429 | 5575 | 5719 | 5861 | 6002 | 6140 |
| 54 | 5135 | 5284 | 5432 | 5577 | 5721 | 5864 | 6004 | 6143 |
| 55 | 5138 | 5287 | 5434 | 5580 | 5724 | 5866 | 6006 | 6145 |
| 56 | 5140 | 5289 | 5437 | 5582 | 5726 | 5868 | 6009 | 6147 |
| 57 | 5143 | 5292 | 5439 | 5585 | 5729 | 5871 | 6011 | 6149 |
| 58 | 5145 | 5294 | 5441 | 5587 | 5731 | 5873 | 6013 | 6152 |
| 59 | 5148 | 5297 | 5444 | 5589 | 5733 | 5875 | 6016 | 6154 |
| 60 | 5150 | 5299 | 5446 | 5592 | 5736 | 5878 | 6018 | 6156 |

# A Table of SINES.

## The Degrees of the Quadrant.

| Min. | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 |
|---|---|---|---|---|---|---|---|---|
| 1 | 6159 | 6295 | 6430 | 6563 | 6694 | 6822 | 6949 | 7073 |
| 2 | 6161 | 6298 | 6432 | 6565 | 6696 | 6824 | 6951 | 7075 |
| 3 | 6163 | 6300 | 6434 | 6567 | 6698 | 6826 | 6953 | 7077 |
| 4 | 6166 | 6302 | 6437 | 6569 | 6700 | 6828 | 6955 | 7079 |
| 5 | 6168 | 6364 | 6439 | 6571 | 6702 | 6831 | 6957 | 7081 |
| 6 | 6170 | 6307 | 6441 | 6574 | 6704 | 6833 | 6959 | 7083 |
| 7 | 6173 | 6309 | 6443 | 6576 | 6706 | 6835 | 6961 | 7085 |
| 8 | 6175 | 6311 | 6446 | 6578 | 6708 | 6837 | 6963 | 7087 |
| 9 | 6177 | 6313 | 6448 | 6580 | 6711 | 6839 | 6965 | 7085 |
| 10 | 6179 | 6316 | 6450 | 6583 | 6713 | 6841 | 6967 | 7092 |
| 11 | 6182 | 6318 | 6452 | 6585 | 6715 | 6843 | 6969 | 7094 |
| 12 | 6184 | 6320 | 6454 | 6587 | 6717 | 6845 | 6972 | 7096 |
| 13 | 6186 | 6322 | 6457 | 6589 | 6719 | 6848 | 6974 | 7098 |
| 14 | 6189 | 6325 | 6459 | 6591 | 6721 | 6850 | 6976 | 7100 |
| 15 | 6191 | 6327 | 6461 | 6593 | 6724 | 6852 | 6978 | 7102 |
| 16 | 6193 | 6329 | 6463 | 6596 | 6726 | 6854 | 6980 | 7104 |
| 17 | 6195 | 6331 | 6466 | 6598 | 6728 | 6856 | 6982 | 7106 |
| 18 | 6198 | 6334 | 6468 | 6600 | 6730 | 6858 | 6984 | 7108 |
| 19 | 6200 | 6336 | 6470 | 6602 | 6732 | 6860 | 6986 | 7110 |
| 20 | 6202 | 6338 | 6472 | 6604 | 6734 | 6862 | 6988 | 7112 |
| 21 | 6205 | 6340 | 6474 | 6606 | 6736 | 6864 | 6990 | 7114 |
| 22 | 6207 | 6343 | 6477 | 6609 | 6738 | 6867 | 6992 | 7116 |
| 23 | 6209 | 6345 | 6479 | 6611 | 6741 | 6869 | 6994 | 7118 |
| 24 | 6211 | 6347 | 6481 | 6613 | 6743 | 6871 | 6997 | 7120 |
| 25 | 6213 | 6349 | 6483 | 6615 | 6745 | 6874 | 6999 | 7122 |
| 26 | 6216 | 6352 | 6486 | 6617 | 6747 | 6875 | 7001 | 7124 |
| 27 | 6218 | 6354 | 6488 | 6619 | 6749 | 6877 | 7003 | 7126 |
| 28 | 6220 | 6356 | 6490 | 6622 | 6752 | 6879 | 7005 | 7128 |
| 29 | 6223 | 6358 | 6492 | 6624 | 6754 | 6881 | 7007 | 7130 |
| 30 | 6225 | 6361 | 6494 | 6626 | 6756 | 6883 | 7009 | 7132 |

# A Table of SINES.

## The Degrees of the Quadrant.

| Min. | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 |
|---|---|---|---|---|---|---|---|---|
| 31 | 6227 | 6363 | 6497 | 6628 | 6758 | 6886 | 7011 | 7134 |
| 32 | 6230 | 6365 | 6499 | 6630 | 6760 | 6888 | 7013 | 7136 |
| 33 | 6232 | 6367 | 6501 | 6633 | 6762 | 6890 | 7015 | 7139 |
| 34 | 6234 | 6370 | 6503 | 6635 | 6764 | 6892 | 7017 | 7141 |
| 35 | 6236 | 6372 | 6505 | 6637 | 6766 | 6894 | 7819 | 7143 |
| 36 | 6239 | 6374 | 6508 | 6639 | 6769 | 6896 | 7021 | 7145 |
| 37 | 6241 | 6376 | 6510 | 6641 | 6771 | 6898 | 7023 | 7147 |
| 38 | 6243 | 6379 | 6512 | 6644 | 6773 | 6900 | 7026 | 7149 |
| 39 | 6245 | 6381 | 6514 | 6646 | 6775 | 6902 | 7028 | 7151 |
| 40 | 6248 | 6383 | 6516 | 6648 | 6777 | 6905 | 7030 | 7153 |
| 41 | 6250 | 6385 | 6519 | 6650 | 6779 | 6907 | 7032 | 7155 |
| 42 | 6252 | 6387 | 6521 | 6652 | 6781 | 6909 | 7034 | 7157 |
| 43 | 6255 | 6390 | 6523 | 6654 | 6783 | 6911 | 7036 | 7159 |
| 44 | 6257 | 6392 | 6525 | 6657 | 6786 | 6913 | 7038 | 7161 |
| 45 | 9259 | 6394 | 6527 | 6659 | 6788 | 6915 | 7040 | 7162 |
| 46 | 6261 | 6396 | 6530 | 6661 | 6790 | 6917 | 7042 | 7165 |
| 47 | 6264 | 6399 | 6532 | 6663 | 6792 | 6919 | 7044 | 7167 |
| 48 | 6266 | 6401 | 6534 | 6665 | 6794 | 6921 | 7046 | 7169 |
| 49 | 6268 | 6403 | 6536 | 6667 | 6796 | 6923 | 7048 | 7171 |
| 50 | 6270 | 6405 | 6539 | 6670 | 6799 | 6925 | 7050 | 7173 |
| 51 | 6273 | 6408 | 6541 | 6672 | 6801 | 6928 | 7052 | 7175 |
| 52 | 6275 | 6410 | 6543 | 6674 | 6803 | 6930 | 7054 | 7177 |
| 53 | 6277 | 6412 | 6545 | 6676 | 6805 | 6932 | 7057 | 7179 |
| 54 | 6279 | 6414 | 6547 | 6678 | 6807 | 6934 | 7059 | 7181 |
| 55 | 6282 | 6417 | 6550 | 6680 | 6809 | 6936 | 7061 | 7183 |
| 56 | 6284 | 6419 | 6552 | 6683 | 6811 | 6938 | 7063 | 7185 |
| 57 | 6286 | 6421 | 6554 | 6685 | 6813 | 6940 | 7065 | 7187 |
| 58 | 6289 | 6423 | 6556 | 6687 | 6816 | 6942 | 7067 | 7189 |
| 59 | 6291 | 6426 | 6558 | 6689 | 6818 | 6944 | 7069 | 7191 |
| 60 | 6293 | 6428 | 6560 | 6691 | 6820 | 6946 | 7071 | 7193 |

# A Table of SINES.

## The Degrees of the Quadrant.

| Min. | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 |
|---|---|---|---|---|---|---|---|---|
| 1 | 7195 | 7315 | 7433 | 7549 | 7662 | 7773 | 7882 | 7988 |
| 2 | 7197 | 7317 | 7435 | 7551 | 7664 | 7775 | 7884 | 7990 |
| 3 | 7199 | 7319 | 7437 | 7553 | 7666 | 7777 | 7885 | 7992 |
| 4 | 7201 | 7321 | 7439 | 7555 | 7668 | 7779 | 7887 | 7993 |
| 5 | 7203 | 7323 | 7441 | 7557 | 7670 | 7781 | 7889 | 7995 |
| 6 | 7205 | 7325 | 7443 | 7559 | 7672 | 7782 | 7891 | 7997 |
| 7 | 7207 | 7327 | 7445 | 7560 | 7673 | 7784 | 7893 | 7998 |
| 8 | 7209 | 7329 | 7447 | 7562 | 7675 | 7786 | 7894 | 8000 |
| 9 | 7211 | 7331 | 7449 | 7564 | 7677 | 7788 | 7896 | 8002 |
| 10 | 7213 | 7333 | 7451 | 7566 | 7679 | 7790 | 7898 | 8004 |
| 11 | 7215 | 7335 | 7453 | 7568 | 7681 | 7791 | 7900 | 8005 |
| 12 | 7218 | 7337 | 7455 | 7570 | 7683 | 7793 | 7901 | 8007 |
| 13 | 7220 | 7339 | 7457 | 7572 | 7685 | 7795 | 7903 | 8009 |
| 14 | 7222 | 7341 | 7459 | 7574 | 7687 | 7797 | 7905 | 8011 |
| 15 | 7224 | 7343 | 7461 | 7576 | 7688 | 7799 | 7907 | 8012 |
| 16 | 3226 | 7345 | 7463 | 7577 | 7690 | 7801 | 7909 | 8014 |
| 17 | 7228 | 7347 | 7464 | 7579 | 7692 | 7803 | 7910 | 8016 |
| 18 | 7230 | 7349 | 7456 | 7581 | 7694 | 7804 | 7912 | 8018 |
| 19 | 7232 | 7351 | 7468 | 7583 | 7696 | 7806 | 7914 | 8019 |
| 20 | 7234 | 7353 | 7470 | 7585 | 7698 | 7808 | 7916 | 8021 |
| 21 | 7236 | 7355 | 7472 | 7587 | 7700 | 7810 | 7918 | 8023 |
| 22 | 7238 | 7357 | 7474 | 7589 | 7701 | 7811 | 7919 | 8025 |
| 23 | 7240 | 7359 | 7476 | 7591 | 7703 | 7813 | 7921 | 8026 |
| 24 | 7242 | 7361 | 7478 | 7593 | 7705 | 7815 | 7922 | 8028 |
| 25 | 7244 | 7363 | 7480 | 7595 | 7707 | 7817 | 7925 | 8030 |
| 26 | 7246 | 7365 | 7482 | 7596 | 7709 | 7819 | 7926 | 8032 |
| 27 | 7248 | 7367 | 7484 | 7598 | 7711 | 7821 | 7928 | 8033 |
| 28 | 7250 | 7369 | 7486 | 7600 | 7712 | 7822 | 7930 | 8035 |
| 29 | 7252 | 7371 | 7488 | 7602 | 7714 | 7824 | 7932 | 8037 |
| 30 | 7254 | 7373 | 7490 | 7604 | 7716 | 7826 | 7933 | 8038 |

# A Table of SINES.

## The Degrees of the Quadrant.

| Min. | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 |
|---|---|---|---|---|---|---|---|---|
| 31 | 7256 | 7375 | 7491 | 7606 | 7718 | 7828 | 7935 | 8040 |
| 32 | 7258 | 7377 | 7492 | 7608 | 7720 | 7830 | 7937 | 8042 |
| 33 | 7260 | 7379 | 7495 | 7610 | 7722 | 7832 | 7939 | 8044 |
| 34 | 7262 | 7381 | 7497 | 7612 | 7724 | 7833 | 7941 | 8045 |
| 35 | 7264 | 7382 | 7499 | 7614 | 7725 | 7835 | 7942 | 8047 |
| 36 | 7266 | 7384 | 7501 | 7615 | 7727 | 7837 | 7944 | 8049 |
| 37 | 7268 | 7386 | 7503 | 7617 | 7729 | 7839 | 7946 | 8051 |
| 38 | 7270 | 7388 | 7505 | 7619 | 7731 | 7840 | 7948 | 8052 |
| 39 | 7272 | 7390 | 7507 | 7621 | 7733 | 7842 | 7949 | 8054 |
| 40 | 7274 | 7392 | 7509 | 7623 | 7735 | 7844 | 7951 | 8056 |
| 41 | 7276 | 7394 | 7511 | 7625 | 7737 | 7846 | 7953 | 8058 |
| 42 | 7278 | 7396 | 7513 | 7627 | 7739 | 7848 | 7955 | 8059 |
| 43 | 7280 | 7398 | 7514 | 7629 | 7740 | 7849 | 7956 | 8061 |
| 44 | 7282 | 7400 | 7516 | 7630 | 7742 | 7851 | 7958 | 8063 |
| 45 | 7284 | 7402 | 7518 | 7632 | 7744 | 7853 | 7960 | 8064 |
| 46 | 7286 | 7404 | 7520 | 7634 | 7746 | 7855 | 7962 | 8066 |
| 47 | 7288 | 7406 | 7522 | 7636 | 7748 | 7857 | 7963 | 8068 |
| 48 | 7290 | 7408 | 7524 | 7638 | 7750 | 7858 | 7965 | 8070 |
| 49 | 7292 | 7410 | 7526 | 7640 | 7751 | 7860 | 7967 | 8071 |
| 50 | 7294 | 7412 | 7528 | 7642 | 7753 | 7862 | 7969 | 8073 |
| 51 | 7296 | 7414 | 7530 | 7644 | 7755 | 7864 | 7970 | 8075 |
| 52 | 7298 | 7416 | 7532 | 7645 | 7757 | 7866 | 7972 | 8076 |
| 53 | 7300 | 7418 | 7534 | 7647 | 7759 | 7867 | 7974 | 8078 |
| 54 | 7301 | 7420 | 7536 | 7649 | 7760 | 7869 | 7976 | 8080 |
| 55 | 7303 | 7422 | 7537 | 7651 | 7762 | 7871 | 7977 | 8082 |
| 56 | 7305 | 7424 | 7539 | 7653 | 7764 | 7873 | 7979 | 8083 |
| 57 | 7307 | 7426 | 7541 | 7655 | 7766 | 7875 | 7981 | 8085 |
| 58 | 7309 | 7428 | 7543 | 7657 | 7768 | 7876 | 7983 | 8087 |
| 59 | 7311 | 7429 | 7545 | 7658 | 7770 | 7878 | 7985 | 8088 |
| 60 | 7313 | 7431 | 7547 | 7660 | 7771 | 7880 | 7986 | 8090 |

# A Table of SINES.

## The Degrees of the Quadrant.

| Min. | 54 | 55 | 56 | 57 | 58 | 59 | 60 |
|---|---|---|---|---|---|---|---|
| 1 | 8092 | 8193 | 8292 | 8388 | 8482 | 8573 | 8662 |
| 2 | 8094 | 8195 | 8294 | 8390 | 8483 | 8575 | 8663 |
| 3 | 8095 | 8197 | 8295 | 8391 | 8485 | 8576 | 8665 |
| 4 | 8097 | 8198 | 8297 | 8393 | 8487 | 8578 | 8666 |
| 5 | 8099 | 8200 | 8298 | 8395 | 8489 | 8579 | 8668 |
| 6 | 8100 | 8201 | 8300 | 8396 | 8490 | 8581 | 8669 |
| 7 | 8102 | 8203 | 8302 | 8398 | 8491 | 8582 | 8670 |
| 8 | 8104 | 8205 | 8304 | 8399 | 8493 | 8584 | 8672 |
| 9 | 8105 | 8206 | 8305 | 8401 | 8494 | 8585 | 8673 |
| 10 | 8107 | 8208 | 8307 | 8402 | 8496 | 8587 | 8675 |
| 11 | 8109 | 8210 | 8308 | 8406 | 8497 | 8588 | 8676 |
| 12 | 8111 | 8212 | 8310 | 8404 | 8499 | 8590 | 8678 |
| 13 | 8112 | 8213 | 8311 | 8407 | 8500 | 8591 | 8679 |
| 14 | 8114 | 8215 | 8313 | 8409 | 8502 | 8593 | 8681 |
| 15 | 8116 | 8216 | 8315 | 8410 | 8503 | 8594 | 8682 |
| 16 | 8117 | 8218 | 8316 | 8412 | 8504 | 8596 | 8684 |
| 17 | 8119 | 8220 | 8318 | 8414 | 8506 | 8597 | 8685 |
| 18 | 8121 | 8221 | 8319 | 8415 | 8507 | 8599 | 8687 |
| 19 | 8122 | 8223 | 8321 | 8417 | 8509 | 8600 | 8688 |
| 20 | 8124 | 8225 | 8323 | 8418 | 8511 | 8602 | 8690 |
| 21 | 8126 | 8226 | 8324 | 8420 | 8513 | 8603 | 8691 |
| 22 | 8128 | 8228 | 8326 | 8421 | 8514 | 8605 | 8692 |
| 23 | 8129 | 8230 | 8328 | 8423 | 8516 | 8606 | 8694 |
| 24 | 8131 | 8231 | 8329 | 8424 | 8517 | 6607 | 8695 |
| 25 | 8133 | 8233 | 8331 | 8426 | 8519 | 8608 | 8697 |
| 26 | 8134 | 8235 | 8332 | 8428 | 8520 | 8610 | 8698 |
| 27 | 8136 | 8236 | 8334 | 8429 | 8522 | 8612 | 8699 |
| 28 | 8138 | 8238 | 8336 | 8431 | 8523 | 8613 | 8701 |
| 29 | 8139 | 8240 | 8337 | 8432 | 8525 | 8615 | 8702 |
| 30 | 8141 | 8241 | 8339 | 8434 | 8526 | 8616 | 8704 |

# A Table of SINES.

## The Degrees of the Quadrant.

| Min. | 45 | 55 | 56 | 57 | 58 | 59 | 60 |
|---|---|---|---|---|---|---|---|
| 31 | 8143 | 8243 | 8340 | 8435 | 8528 | 8618 | 8705 |
| 32 | 8144 | 8245 | 8342 | 8437 | 8529 | 8619 | 8706 |
| 33 | 8146 | 8246 | 8344 | 8438 | 8531 | 8621 | 8708 |
| 34 | 8148 | 8248 | 8346 | 8440 | 8532 | 8622 | 8709 |
| 35 | 8149 | 8249 | 8347 | 8442 | 8535 | 8623 | 8711 |
| 36 | 8151 | 8251 | 8348 | 8443 | 8526 | 8625 | 8712 |
| 37 | 8153 | 8253 | 8350 | 8445 | 8537 | 8627 | 8713 |
| 38 | 8155 | 8254 | 8352 | 8446 | 8539 | 8629 | 8715 |
| 39 | 8156 | 8256 | 8353 | 8448 | 8540 | 8630 | 8716 |
| 40 | 8158 | 8257 | 8355 | 8449 | 8542 | 8631 | 8718 |
| 41 | 8160 | 8259 | 8356 | 8451 | 8543 | 8633 | 8719 |
| 42 | 8161 | 8261 | 8358 | 8452 | 8545 | 8634 | 8720 |
| 43 | 8163 | 8263 | 8360 | 8454 | 8546 | 8636 | 8722 |
| 44 | 8165 | 8264 | 8361 | 8455 | 8548 | 8637 | 8724 |
| 45 | 8166 | 8266 | 8363 | 8457 | 8549 | 8638 | 8725 |
| 46 | 8168 | 8267 | 8364 | 8458 | 8551 | 8640 | 8726 |
| 47 | 8170 | 8269 | 8366 | 8460 | 8552 | 8641 | 8728 |
| 48 | 8171 | 8271 | 8367 | 8462 | 8554 | 8643 | 8729 |
| 49 | 8172 | 8272 | 8369 | 8463 | 8555 | 8644 | 8731 |
| 50 | 8174 | 8274 | 8371 | 8465 | 8557 | 8646 | 8732 |
| 51 | 8176 | 8276 | 8372 | 8466 | 8558 | 8647 | 8733 |
| 52 | 8178 | 8277 | 8374 | 8468 | 8560 | 8648 | 8735 |
| 53 | 8180 | 8279 | 8375 | 8470 | 8561 | 8650 | 8736 |
| 54 | 8181 | 8281 | 8377 | 8471 | 8563 | 8651 | 8738 |
| 55 | 8183 | 3282 | 8379 | 8473 | 8564 | 8[illegible] | 8739 |
| 56 | 8185 | 8284 | 8380 | 8474 | 8566 | 8655 | 8740 |
| 57 | 8186 | 8285 | 8382 | 8476 | 8567 | 8656 | 8742 |
| 58 | 8188 | 8287 | 8383 | 8477 | 8568 | 8657 | 8743 |
| 59 | 8190 | 8289 | 8385 | 8479 | 8570 | 8659 | 8745 |
| 60 | 8191 | 8290 | 8387 | 8480 | 8572 | 8660 | 8746 |

# A Table of Sines.

## The Degrees of the Quadrant.

| Min | 61 | 62 | 63 | 64 | 65 | 66 | 67 |
|---|---|---|---|---|---|---|---|
| 2 | 8749 | 8832 | 8913 | 8990 | 9065 | 9138 | 9207 |
| 4 | 8752 | 8835 | 8615 | 8993 | 9068 | 9140 | 9209 |
| 6 | 8755 | 8838 | 8918 | 8995 | 9070 | 9142 | 9212 |
| 8 | 8758 | 8841 | 8921 | 8998 | 9073 | 9145 | 9214 |
| 10 | 8760 | 8843 | 8923 | 9000 | 9075 | 9147 | 9216 |
| 12 | 8763 | 8846 | 8926 | 9003 | 9078 | 9149 | 9218 |
| 14 | 8766 | 8849 | 8928 | 9006 | 9080 | 9152 | 9221 |
| 16 | 8769 | 8852 | 8931 | 9008 | 9083 | 9154 | 9223 |
| 18 | 8771 | 8854 | 8934 | 9011 | 9085 | 9156 | 9225 |
| 20 | 8774 | 8857 | 8936 | 9013 | 9087 | 9159 | 9228 |
| 22 | 8777 | 8860 | 8939 | 9016 | 9090 | 9161 | 9230 |
| 24 | 8780 | 8862 | 8941 | 9018 | 9092 | 9164 | 9232 |
| 26 | 8783 | 8865 | 8944 | 9021 | 9095 | 9166 | 9234 |
| 28 | 8785 | 8867 | 8947 | 9023 | 9098 | 9168 | 9236 |
| 30 | 8788 | 8870 | 8945 | 9026 | 9100 | 9171 | 9239 |
| 32 | 8791 | 8873 | 8952 | 9028 | 9102 | 9173 | 9241 |
| 34 | 8794 | 8875 | 8954 | 9031 | 9104 | 9175 | 9243 |
| 36 | 8796 | 8878 | 8957 | 9033 | 9107 | 9177 | 9245 |
| 38 | 8799 | 8880 | 8960 | 9036 | 9109 | 9180 | 9247 |
| 40 | 8802 | 8883 | 8962 | 9038 | 9112 | 9182 | 9250 |
| 42 | 8805 | 8886 | 8965 | 9041 | 9114 | 9184 | 9252 |
| 44 | 8808 | 8889 | 8967 | 9043 | 9116 | 9187 | 9254 |
| 46 | 8810 | 8891 | 8970 | 9046 | 9119 | 9189 | 9256 |
| 48 | 8813 | 6894 | 8972 | 9048 | 9121 | 9191 | 9259 |
| 50 | 8816 | 8897 | 8975 | 9051 | 9123 | 9194 | 9261 |
| 52 | 8819 | 8899 | 8978 | 9054 | 9126 | 9196 | 9263 |
| 54 | 8821 | 8902 | 8980 | 9056 | 9128 | 9198 | 9265 |
| 56 | 8824 | 8905 | 8983 | 9058 | 9131 | 9200 | 9267 |
| 58 | 8827 | 8907 | 8985 | 9061 | 9133 | 9203 | 9270 |
| 60 | 8829 | 8910 | 8988 | 9063 | 9135 | 9205 | 9272 |

# A Table of SINES.

## The Degrees of the Quadrant.

| Min. | 68 | 69 | 70 | 71 | 72 | 73 | 74 |
|---|---|---|---|---|---|---|---|
| 2 | 9272 | 9338 | 9399 | 9457 | 9512 | 9565 | 9614 |
| 4 | 9216 | 9340 | 9401 | 9459 | 9514 | 9566 | 9616 |
| 6 | 9278 | 9342 | 9403 | 9461 | 9516 | 9568 | 9617 |
| 8 | 9280 | 9344 | 9405 | 9463 | 9518 | 9570 | 9619 |
| 10 | 9283 | 9346 | 9407 | 9465 | 9519 | 9571 | 9620 |
| 12 | 9285 | 9348 | 9409 | 9466 | 9521 | 9573 | 9622 |
| 14 | 9287 | 9351 | 9411 | 9468 | 9523 | 9575 | 9624 |
| 16 | 9289 | 9352 | 9413 | 9470 | 9525 | 9576 | 9625 |
| 18 | 9291 | 9354 | 9415 | 9472 | 9527 | 9578 | 9627 |
| 20 | 9293 | 9356 | 9417 | 9474 | 9528 | 9580 | 9628 |
| 22 | 9296 | 9358 | 9419 | 9476 | 9530 | 9581 | 9630 |
| 24 | 9298 | 9360 | 9420 | 9478 | 9532 | 9583 | 9632 |
| 26 | 9300 | 9363 | 9422 | 9480 | 9534 | 9585 | 9633 |
| 28 | 9302 | 9365 | 9424 | 9481 | 9535 | 9586 | 9635 |
| 30 | 9304 | 9367 | 9426 | 9483 | 9537 | 9588 | 9636 |
| 32 | 9306 | 9369 | 9428 | 9485 | 9539 | 9590 | 9638 |
| 34 | 9308 | 9371 | 9430 | 9487 | 9540 | 9591 | 9639 |
| 36 | 9310 | 9373 | 9432 | 9489 | 9542 | 9593 | 9641 |
| 38 | 9313 | 9375 | 9434 | 9491 | 9544 | 9595 | 9642 |
| 40 | 9315 | 9377 | 9436 | 9492 | 9546 | 9596 | 9644 |
| 42 | 9317 | 9380 | 9438 | 9494 | 9548 | 9598 | 9645 |
| 44 | 9319 | 9381 | 9440 | 9496 | 9549 | 9600 | 9647 |
| 46 | 9321 | 9383 | 9442 | 9498 | 9551 | 9601 | 9648 |
| 48 | 9323 | 9385 | 9444 | 9500 | 9553 | 9603 | 9650 |
| 50 | 9325 | 9387 | 9446 | 9501 | 9554 | 9604 | 9651 |
| 52 | 9327 | 9389 | 9447 | 9503 | 9556 | 9606 | 9653 |
| 54 | 9329 | 9391 | 9449 | 9505 | 9558 | 9608 | 9655 |
| 56 | 9332 | 9393 | 9451 | 9507 | 9559 | 9609 | 9656 |
| 58 | 9334 | 9395 | 9453 | 9509 | 9561 | 9611 | 9658 |
| 60 | 9336 | 9397 | 9455 | 9510 | 9563 | 9613 | 9659 |

# A Table of SINES.

## The Degrees of the Quadrant.

| Min. | 75 | 76 | 77 | 78 | 79 | 80 | 81 | 82 |
|---|---|---|---|---|---|---|---|---|
| 5 | 9663 | 9706 | 9747 | 9784 | 9819 | 9850 | 9879 | 9905 |
| 10 | 9667 | 9710 | 9750 | 9787 | 9822 | 9853 | 9881 | 9907 |
| 15 | 9670 | 9713 | 9753 | 9790 | 9824 | 9855 | 9884 | 9909 |
| 20 | 9674 | 9717 | 9756 | 9793 | 9827 | 9858 | 9886 | 9911 |
| 25 | 9678 | 9720 | 9760 | 9796 | 9830 | 9860 | 9888 | 9912 |
| 30 | 9681 | 9724 | 9763 | 9799 | 9832 | 9863 | 9890 | 9914 |
| 35 | 9685 | 9727 | 9766 | 9802 | 9835 | 9865 | 9892 | 9916 |
| 40 | 9689 | 9730 | 9769 | 9805 | 9838 | 9868 | 9894 | 9918 |
| 45 | 9692 | 9734 | 9772 | 9808 | 9840 | 9870 | 9896 | 9920 |
| 50 | 9696 | 9737 | 9775 | 9811 | 9843 | 9872 | 9898 | 9922 |
| 55 | 9699 | 9740 | 9778 | 9813 | 9846 | 9874 | 9900 | 9924 |
| 60 | 9703 | 9744 | 9781 | 9816 | 9848 | 9877 | 9903 | 9925 |

## The Degrees of the Quadrant.

| Min | 83 | 84 | 85 | 86 | 87 | 88 | 89 |
|---|---|---|---|---|---|---|---|
| 5 | 9927 | 9947 | 9963 | 9977 | 9987 | 9994 | 9998 |
| 10 | 9929 | 9948 | 9964 | 9978 | 9988 | 9995 | 9998 |
| 15 | 9931 | 9950 | 9965 | 9978 | 9988 | 9995 | 9999 |
| 20 | 9932 | 9951 | 9967 | 9979 | 9989 | 9996 | 9999 |
| 25 | 9934 | 9952 | 9968 | 9980 | 9990 | 9996 | 9999 |
| 30 | 9936 | 9954 | 9969 | 9981 | 9990 | 9996 | 9999 |
| 35 | 9937 | 9955 | 9970 | 9982 | 9991 | 9997 | 9999 |
| 40 | 9939 | 9957 | 9971 | 9983 | 9992 | 9997 | 9999 |
| 45 | 9940 | 9958 | 9972 | 9984 | 9992 | 9998 | 9999 |
| 50 | 9942 | 9959 | 9973 | 9984 | 9993 | 9998 | 10000 |
| 55 | 9944 | 9960 | 9975 | 9985 | 9993 | 9998 | 10000 |
| 90 | 9945 | 9962 | 9976 | 9985 | 9994 | 9998 | 10000 |
| | | | | | | | 10000 |

## The Extraction of Roots.

IT is not unnecessary, before we do enter into this Order and method of teaching how to extract a Root, to shew the divers kinds and their definitions: Therefore you must know that of Roots there are sundry sorts, according to the quantities from which they are derived, as the Squares, Cubes, Squared Squares, Surdsolids, &c. for the numbers receive their names of the said quantities, every quantity having his Root, which may be called the first quantity. Because it is the side or beginning of the quantity whereunto it is set: Numbers of the second quantity are called Squares, of the third Cubes, of the fourth squared square, and so forth: wherein you may proceed infinitely if you will; but you shall seldome or never have use for the extraction of the Root of any quantity more then Squares and Cubes: A Square number is the product of any number multiplyed in it self, and the Root thereof is the multiplyer, whereby the same square number is produced: As for example, 4 is a square number consisting of the multiplication of 2 in it self, which is the Root thereof.

A Cubick number is the product of any number multiplyed into it self, and the same product multiplyed again by the first number; As 2 multiplyed by it self is 4, that Product multiplyed againe by 2, the first number makes 8, which is a Cubick number, and the Root thereof.

A Squared square number is produced of 3 multiptications, first any number by it self makes a square number, that product again by the first Root or multiplyer, makes a Cubick number: and lastly, that Product again by the first figure or Root, produceth a squared square number, as 2 multiplyed in it self makes 4, a square number, that again by 2 makes 8, which is a Cubicke number, and then that product again by 2, produceth 16, which is a squared square number, and the Root thereof is 2. A Surdsolid number is the Product of a number multiplyed 4 times by the Root thereof: as 32 is a surdsolid number, the number whereof is 2: for 2 multiplyed in it self, is 4, that multiplyed again by 2 is 8, the same product again by 2, makes 16: and lastly, the same product multiplyed by the first number 2, makes 32, There-

fore I conclude that 32 is a Surdsolide number, and the number 2, whereby the said number is produced, is the Surdsolide root to the said number: and thus multiplying the last product by the first Number or Root, you may proceed infinitely, but more then these are needless, and as I said before, without any great or common use.

Now for the finding of the Root, it must be done according to the quantity whereof it taketh Denomination, as whether it be of a Square or Cube or otherwise: which knowen, let us proceed to the working thereof.

You must understand that the order of extracting the Root of any quantity, is not much unlike to Division, differing only in this, that whereas in Division the Devisor is known, but here it is to finde: also in Division you alwayes keep one Devisor, but in this, you must change your Devisor at each remouing, which is at the finding of every figure contained in the Root. Now therefore I will lay down one generall way for the Extraction of the Root of all quantities whatsoever, which is done by certain numbers applyed to each particular quantity, which are these: For the Square root in one number required, which is 20. For the Cube two numbers, which are 300 and 30. For the Squared square three numbers, viz. 4000, 600, and 40.

Thus having declared the kinds, numbers, quantities, and order of the Extraction of all sorts of Roots, it followeth that we proceed to the practise thereof: And first to extract the Square root of any number, you must consider as before I have said, that 20 is the number for the same quantity: Also you must learn by memory the just Square of all the 9 Digits, which if you know not, this Table will stand in some stead: where you see that against every of the 9 Digits aforesaid towards the right hand is the square of that unity against which it doth stand: which knowen, set down the number whereof you would extract the square root, then under the last figure at the right hand put a prick, and then proceeding towards the left hand under every second figure put a prick, that done, begin with your first a Quotient as in Division: Now for to finde the Root of your given number, seek the greatest square

| | |
|---|---|
| 1 | 1 |
| 2 | 4 |
| 3 | 9 |
| 4 | 16 |
| 5 | 25 |
| 6 | 36 |
| 7 | 49 |
| 8 | 64 |
| 9 | 81 |

Square number contained in the number over the first prick, that square number take from the number over the said first prick, and set the Remainer over it, the root of which square number put in the quotient for the figure of the root: that root multiply by 20 the number for the square root, and then looke how often the Product therof may be taken from the number over, or to the left hand of the second prick, which put in your quotient for the second figure of the root: but this is to be noted for a generall rule; that you must take no greater number for your second figure then that the square therof added with the former Product may be taken from the number over the said second prick: and also look how many pricks are under your given number, so many Figures must be in the quotient, for the root of the said number: then having found 2 figures in the quotient, if there be any more pricks, multiply the whole number in the quotient by 20, and seek how often the Product therof, may be taken from the number over or belonging to the next prick, which number put in the quotient, and adding the square therof to the former Product subtract the whole summe from the number over the said prick, and cancelling the said number as at each remove you must do, set the Remainer over it, and if there be any more pricks unto one, do as you did before, always multiplying the quotient by 20, thereto adding the square of the last figure, and the totall summe being subtracted from the last Remainer, if there rest nothing, it is a Square number or else not; which you may prove if you multiply the root by it self squarely, for the root being truly extracted will produce the first given number. But because that Examples are easiest for the understanding, let 104976, be the given number, whereof I would know the square root, viz. what number being multiplyed in it self, will produce the foresaid number of 104976. Therefore, first I set down the said number, and under the last figure towards the right hand, which in this Example is 6, I put a prick or point, another under the 9, and lastly another under 0, leaving one figure between every prick: which done and the quotient drawn the given number will stand thus: 104976
whereby I see that the root of the said number must consist of 3 figures, because it hath 3 pricks under it: then I seek the

the greateſt ſquare, number is, 10, it being the number belonging to the firſt prick towards the left hand, that I finde to be 9, which is produced of 3 multiplyed ſquarely, therefore I put 3 in the quotient for the firſt figure of the root, and the ſquare thereof being 9, I ſubtract from 10 the number over the firſt prick, and there reſts 1. The order of which work will ſtand thus: where you ſee that the figures over the firſt prick is cancelled; there is 3 in the quotient for the firſt figure of the root and 1 reſts, which with the figures betwixt it and the next prick, makes 149 for the number of the ſecond prick. Now for the ſecond figure of the root, I multiply 3 the root already found, by 20, and the Product is 60, that I ſeek how often I may take from 149 the number over the ſecond prick which I may do 2 times, for 2 times 60 is 120, whereunto the ſquare of 2, which is 4, being added, makes 124, that ſubtracted from 149 leaves 25, therefore I put 2 in the quotient for the ſecond figure of the root, and cancelling the figures over the ſecond prick, the remainer being put over it, the working thereof will ſtand in this order: where you ſee the quotient is 32 for the two firſt figures of the root, and the figures of the two firſt pricks being cancelled, there reſts 25, which with the other figures betwixt them, and the third and laſt prick makes 2576, for the number over the laſt prick: now therefore to finde the laſt figure of the root, I multiply the root already found, that is to ſay 32 by 20, and the Product thereof is 640, that I ſeek how often it may be taken out of 2576, the number over the laſt prick, which may be done 4 times, for 4 times 640, is 2560, whereunto if I adde the ſquare of 4, there will amount 2576: which becauſe it may be taken from the number remaining over the laſt prick, I put 4 in the quotient for the laſt figure of the root, and ſubtracting the former Product of 2576, from the number over the laſt prick, which is likewiſe 2576 there,

$$\begin{array}{l} \;\;1 \\ \cancel{1}\cancel{0}4976\,|\,\underline{3} \\ \;\;9 \end{array}$$

$$\begin{array}{ll} \cancel{1}\cancel{2}5 & \quad 1 \\ \cancel{1}\cancel{0}\cancel{4}\cancel{9}76\,|\,\underline{32} & \\ \;\;9 & \\ 124 & \end{array} \qquad \begin{array}{r} 20 \\ 3 \\ \hline 60 \\ 2 \\ \hline 120 \\ 4 \\ \hline 124 \end{array}$$

$$\begin{array}{ll} \;\;\cancel{1}\cancel{2}5 & \\ \cancel{1}\cancel{0}\cancel{4}\cancel{9}78\,|\,\underline{324} & \\ \;\;9 & \\ \;\;124 & \\ & 2576. \\ & \quad 32 \\ & \quad 20 \\ \hline & 2576 \end{array}$$

2576, there will rest nothing, therefore I cancell those figures likewise, and thereby conclude 104676, to be a Square number, and 32 to be the root thereof: the proof whereof is by multiplying the root into it self squarely: for if you multiply 324 by 324, the first given number of 104976 will be produced, the working whereof will be as above you may see.

640
4
2360
16
2576
324
324
1296
648
972

This example in my mind might be sufficient, with often use and practise, to bring perfection in this kind of Extractions, because that although the summe be never so great, it is done all by one manner of work: yet nevertheless, if I did not think that thou wouldest complain rather of tediousnesse of learning, then of the difficulty in teaching, I would give another example: for variety of Examples makes the worke seeme the more easie. Therefore once againe: let 548730625 be a given number, whereof I would know the Square root, first I put pricks or points under the given number in such order as you see beginning at the last figure towards the right hand, and proceeding towards the left, leaving one figure unpointed betwixt every prick, where you see that the whole given number consists of 5 pricks, therefore of so many figures must your Root or Quotient be: then seeking a Quotient I seek the greatest Square number in 5, which is the number over the first prick, which greatest Square number I finde to be 4, and the root thereof 2, for two times 2 is four, therefore I put two in the quotient, and taking 4 the square thereof from 5 the number over the first prick, there will rest 1, which I set over 5 cancelling the said 5, the work whereof will stand as against: then for the second figure of the root I multiply the first figure of the root already found by 20 and the product is 20, that I seek how often may be taken from 148, the number remaining over the second prick, which may be done 3 times for 3 times, 40 is 120, whereunto the square of 4 being added

1
548730625 | 2
4

anses makes 129, then I put 3 in the quotient for the second figure of the root, and subtracting 129 the last product from 148, the number remaining over the second prick, there will rest 19, which with the other figures betwixt them, and the next prick, makes 1973, therefore I cancell the 148, and setting the remainer over it I have 1973, for the number over the third prick, and 23 in the quotient for the two first figures of the root: now for the third figure of the root, I multiply 23 the root already found by 20, the product is 460, which may be taken from 1973, the number remaining over the third prick 4 times, for 460, multiplyed by 4 makes 1840, whereunto adding 16, the Square of 4 the product is 1856, therefore I put 4 in the quotient for the 3 figure of the root, and subtracting 1856 from 1973, the number over the third prick, there will remain 117, which with the other figures betwixt them and the next prick, makes 11706, for the number over the fourth prick, and there is in the quotient 234 for the root already found, the whole work standing as above: Again, for to find the fourth figure of the root, I multiply 234 the root found, by 20, the product whereof is 4680, which may be taken out of 11706 two times, for 4680 multiplyed by 2, makes 9360, which with 4 the square of 2, makes in all 9364. the same being substracted from 11706, the number remaining over the fourth prick, there will rest 2342, which with the other Figure betwixt them, and the fifth or last prick; makes 234225 for the number remaining over the last pricke, therefore making my substraction, I set the ramainer over it, and put 2 in the quotient for the fourth figure of the root, as you may see in the Margin: then to find the last figure of the root of this given number aforesaid I multiply the whole root already found, viz. 2342 by 20, the product is 46840, which may be taken from

```
 x19
 5.4.8.7.3.0.6.2.5 | 23
 4
 129

 1
 x123
 5.4.8.7.3.0.6.2.5 | 234
 4
 129
   1856

   123
 x19742
 5.4.8.7.3.0.6.2.5 | 2342
 4
 129
   1856.
   9364
 234225 the
```

234225. the number over the last prick 5 times, for 46840 multiplyed by 5, makes 234200, whereunto if I adde 25. the square of 5, the whole Product will be 234225, which number is equall to the number over the last prick, therefore I put 5. in the quotient, for the last figure of the root, and subtracting the whole summe of the last Product, viz. 234225 from the number over the last point or prick, which is likewise 234225 there will remain nothing, whereby I finde 548730625 the given number, to be a Square number, and the root thereof to be 23425, which is the number found out in the quotient, as in the working thereof you may more plainly perceive.

For proof whereof, if you multiply 23425 the root squarely into it self, the Product thereof will be equall to the first given number.

I doubt not but to any indifferent conceit, these two Examples will suffice, as well as if I should contribe a whole volume thereof when it is so that a given number is a right Square number, but if the given number be not a Square number, it is impossible for to finde an exact root thereto, but that after the work there will remain something as a fraction or part of a number more to be added to the quotient: for the true and perfect valuation of which fraction or remainer, none as yet could attain, but they have set down so nèer a way for the extraction of the root of any number not being a square number that thereby no great error may be perceived: For the knowledge and better understanding of which, let this be a familiar Example: you know that 16 is a right Square number, and the Square root thereof is 4, but if you would extract the Square root of 18, you should have 4 in your quotient likewise for the root thereof, but then there will rest 2, whereby you see that 18 is no Square number, neither can you know what fraction to make of it, by reason that you have no certain Devisor, which might stand for Denominator to the Numerator or Remainer: onely let this suffice, that to finde the nearest root thereof the Rule is thus: double the Remainer for the Numerator and Quadruple; viz. multiply the root by 4, and thereto adde 1, for the Denominator to the said Numerator, as in this example, to extract the nearest Square root of 18, I finde 4 to be

$18\frac{4}{9}$
16

in the quotient, with 1 remaining, which 2 being doubled makes 4 for the Numerator, and 4 the root being multiplyed by 4 makes 16, with 1 added therewith, makes 17 for the Denominator, whereby I say, that $4\frac{1}{17}$ is the nearest Square root of 18 which may be found out: for if you reduce $\frac{4}{17}$ into one common Denomination, and then multiply them squarely, the Product will be $17\frac{11}{18}$ which is but $\frac{1}{18}$ too little.

Thus having declared the ayer how to extract the square root of any number: It resteth now that I shew the manner of extracting the Cube root of any number: As for the principall uses thereof you shall find in the generall practise of the Mathematicks.

To find out the Cube roote of any given number, being a right Cube number, first put down the given number, and as in the Square number, you put points by pairs: beginning at the right hand unto the left, leaving betwixt each point one figure void; so in the extraction of the root of a Cube number, you must leave two figures void or unpickt betwixt every point, and as in the Square roote, so likewise in this: looke how many points are under the given number, so many figures must be contained in the roote thereof, which is also to be observed in extracting the root of any quantity whatsoever: these things being considered, it is also necessary, that you know the greatest Cubick number of every of the 9 unities, whereof the Table here under specified maketh explanation: where you see that against each unitie standeth the Cube number thereof, which being known, and the given number pickt, with a quotient drawn as before I have shewed: to extract the Cube roote, you have 2 numbers, viz. 300, and 30, but because the working thereof would be too long to expresse in terms, let 13824 be a given number, whereof I would extract the Cube root.

| | | |
|---|---|---|
| 1 | .... | 1 |
| 2 | .... | 8 |
| 3 | .... | 27 |
| 4 | .... | 64 |
| 5 | .... | 125 |
| 6 | .... | 216 |
| 7 | .... | 343 |
| 8 | .... | 512 |
| 9 | .... | 729 |

First, I put down that number aforesaid with points under it and a quotient in this order, 13824; whereby I see that the root thereof must consist of two Figures, because so many points do belong unto the given number: for the first figure whereof, I seeke

the

the greatest Cube number contained in 13, the number over the first point towards the left hand, which I find to be 8, the Cube root thereof, which is 2, I put in the quotient for the first figure of the root, and substracting 8 from 13 rests 5, which I put over 13, cancelling the said 13, which done, the worke will be as beleiw.

Now for to find the second figure of the root, I set down the 2 numbers which serveth for the extraction of the Cube root, viz. 300, 30 & underneath 30. I put the roote already found, which is 2, and against 300 the square thereof, which is 4, these two figures I set towards the left hand of them, then I multiply 300 by 4, the figure which standeth against it, and the product is 1200, that I seek how often I may take from 5824, the number over the second prick, which I may see four times, therefore I put 4 in the quotient for the second figure, and upon the right hand against 300, I set 4 the last found number in the quotient, and against 30, I put 16, the Square thereof, and underneath 30, I put 64, which is the Cube of 4, then multiplying all the figures which are in a row into one product, viz. 4 by 300, makes 1200, and that again by 4, makes 4800 for that Product; then for the next 2 by 30, makes 60, and that by 16 makes 960 for the second Product, which I set downe together each under other. Lastly, because 64 hath no other number to be multiplied therewith, I put that down under them, which done, I adde them altogether, and the totall summe is 5824, the same substracted from the number over the last prick, resteth nothing, whereby I see that 13824, is a Cubick number, and the Cube root therefore is 24, as you may more plainly see by the working thereof, which is put in the margine above, where you see that

| | |
|---|---|
| 5 | |
| 2 ) 13 8 2 4 ( 24 | |
| 8 | |
| 4 | 300 |
| 2 | 30 |
| | 1200 |
| | 4 |
| | 4800 |
| 60 | |
| 16 | |
| 960 | |
| | 960 |
| | 64 |
| | 5824 |

24 being

24 being multiplyed into it self, and that product again by 24. the first multiplyer, the product is 13824 which is equall to the first given number.

Againe, seeing that Examples are the easiest method of teaching and plainest for understanding: let 12551868224, be a given number: whereof I would extract the Cube root; First, having pricht it and drawne a Quotient for the Root, thus 12551868224, I see that the root must consist of 4 figures, so many pricks being under the given number. For the finding of which figures I seek first the greatest Cube number in 12, which is 8, the root whereof being 2, I put in the quotient, for the first figure of the root substracting 8, the Cube thereof from 12 the number over the first prick, rest 4. then for the second figure of the root I put down 300, and 30, the numbers for the Cube root against 30, I set 2, the root found: and against 300, four the square thereof: and multiplying 300 by 4, the product is 1200 that may be taken out of 4551, the number over the second prick 3 times, therefore I put 3 in the Quotient, and likewise after 300, and the Square, thereof which is 9, after 30, and the Cube thereof which is 27, I put under 30, then I multiply all the numbers in the first row, each by the other, viz. 4 by 300 makes 1200, and the same product again by 3 makes 3600, which I set by it self: then I again multiply 2 by 30, is 60, and that again by 9, makes 540, which I put under the other product; Lastly, because 27 hath no number wherewith to be multiplyed I set down likewise under both the other and the 3 numbers being set in order one under another, as you see I adde them altogether, and the whole product is the same I substract from 4551, the number over the nert prick

| | | |
|---|---|---|
| 5824 | | 24 |
| | | 24 |
| | | 96 |
| | | 48 |
| | | 576 |
| | | 576 |
| | | 24 |
| | | 2304 |
| | | 1152 |
| | | 13824 |

4 x2551868224 |23
8

| | | |
|---|---|---|
| 4 | 300 | 3 |
| 2 | 30 | 9 |
| | 27 | |

| |
|---|
| 3600 |
| 540 |
| 27 |
| 4167 |
| 4167 |

4167, and there will remain 384 to joyn with the number over the 3 prick: which done, the work will stand in this order as you see.

4284
x2x5x868224 |23
8
4167
529 300
23 30

Now for the third Figure of the root, I put down 300 and 30, as before, and again 30 at the left hand, I put 23, the root already found, and against 300 the Square thereof which is 529, then multiplying 529 by 300, the Product is 158700, which may be twice taken from 384868, therefore I put 2 in the Quotient for the third figure of the root, and likewise put 2 to the right hand of 300, and the square thereof which is 4, at the right hand of 30, and the Cube thereof being 8, I put under 30, which numbers will stand as above; then multiplying all the numbers in one row each by other, into one Product, viz. 529 by 300, makes 158700, and that again by 2, is 317400, for the whole Product of that row, which I set down by it self, then I multiply 23 by 30, is 690, and that again by 4, is 2760 for the Product of the second row.

320168
6
438470 0
x2x5x868224 |232
8
4167
320168

Lastly, because 8 hath no number with it, I put it down under the other, and then adding all the three Summes together, the Product is 320168, the same taken from 384868, the number over the third prick rests for the number over the last prick 64700224, and in the Quotient, is 232, the whole work being as you see above.

Now to finde the fourth and last figure of the root, I put down the two numbers again which serve for the Cube root, viz. 300 and 30. At the left hand of 30 I put 232, the numbers in the quotient, and at the left hand of 300, I set the square of 232, which is 53824 in this order: Then multiplying 53824 by the Product is 16147200, which I seek how often may be had in 64700224, the numbers remaining over the last prick, that may be done 4 times: Therefore I put 4 in the Quotient, for the fourth and last figure of the root, and also I set the said 4, at the right

53824
232

right hand of 300, and the square thereof which is 16 at the right hand of 30, and the Cube thereof being 64, I put right underneath 30, which done, all the numbers will stand as above: Then multiplying all the numbers in each row, into their several Products, viz. 53824 by 300, makes 16147200; that again by 4, is 64588800, which I set by it self; Then again, 232 by 300, is 6960, the same Product by 16, makes 111360, which I put down under the other.

53824‴ 300″ 4
232‴ 30″ 16
64

Lastly, because 64 hath no other number to be multiplied therewith, I put it down likewise, under the other two numbers and adding the three Products together, the whole summe thereof will be 64700224, which being subtracted from the number remaining over the last prick, leaves nothing: So have I in the Quotient, 2324, for the Cube roote of 12551868224, the given number: the whole work whereof as here set down in the margine. For the proof whereof, if you multiple the Roote, viz. 2324 Cubickly in it self, the Product thereof will be equall with the first given number, as for Example, you may see in the working.

Where you see that 2324 the Roote being multiplied into it self Squarely, and then likewise the whole Product thereof again, by the same roote 2324. The totall summe amounting thereof 12551868224, is the first given number.

But when you have a number given to extract the Cube root, and the foresaid given number be not a right Cube number, whereby you cannot come to any perfect root thereof, but that there will remain some fraction or broken number after your said Extraction, onely the manner to extract the nearest roote of a number not Cubicall, as most Writers do affirm, is thus:

12552868224

The difference betwixt the Cubick number of the Root, and the Cubick number of a number more then the Root, by an unity shall be the Denominator to the remainer, 1, added also thereto.

As for Example.

Let 12 be a number given, which not being a right Cube number, I would find the nearest Root thereof: First the greatest Cubick number in 12 is 8, the Cube roote whereof being 2, I put in the

the Quotient, and subtracting 8 the Cube thereof from 12, there will rest 4, which 4 being over, sheweth the 12 is no Cubick number; therefore adding 1 to 4, makes 5, which I put for the Numerator; and to know the Denominator thereto, I set over the Cube 2, the root found, which is 8, and likewise 27 the Cube of 3, which is a number more than the root by 1, then substracting the one from the other, viz. 8 from 17, leaves 19 for the Denominator, By which reason the néerest Cubick root of 12 is $\frac{5}{19}$, which being reduced and multiplyed cubickly, makes $11\frac{97}{859}$, the same abreviated makes 11 and very néere $\frac{1}{2}$, and it should be 12; therefore the error is $\frac{1}{2}$ too little, which although in this is no great error, yet in a great Summe the errour would be very much: Therefore for those which desire a more exact and perfect extraction, of the Square or cube root, from numbers not being right square or cubick numbers: Oght, Rested in his Wherstone of Wit, setteth down an exact way (but having tedious) which is thus: For the Square root adde to the given number so many times two Ciphers, as you desire the néerness of the Root: And for the cubick root so many times 3 Ciphers as you desire, the exactness of the Root thereof: and under the said Ciphers, put pricks in such order, as before is taught; and then marke how many pricks there is over and besides the pricks of the given number: and then extract the root from all those Ciphers in such order, as you did before: for if there be 1 more, the root shall be tenths, and the remainer parts of $\frac{1}{10}$, if there be 2 points or pricks over, more then the given number, then the roote shall be hundreths, and the remainer parts of $\frac{1}{100}$, if three pricks be over, the root shall be thousandths, and the remainer parts of $\frac{1}{1000}$; and so you may come to a very néer root, but not to any exact or perfect root, unlesse the given number be a right Square or cubicall number.

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## A Declaration of the Tables of Longitude and Latitude of places following.

THe Tables hereafter following, shewing the Longitude and Latitude of places, viz. of Kingdomes, Provinces, Cities, Iles,

Iſles, Capes, Bayes, Riters, and Mountains, eſpecially the moſt principall of them in the whole World, are gathered from the lateſt Deſcriptions, Maps and Charts, aſwell Univerſall, as perticular: who albeit they differ greatly in Longitude, yet in Laticude, moſt of them agrée: and alſo having a reſpect to the beginning of each of their ſeverall Longitudes, they come all to a néere agrément: For ſome begining their Longitude at the Weſtermoſt part of Africa, makes the Longitude of London to be about 10 degrées 20 minutes: Others begining at the Canary Ilands, makes the Longitude of London 18 degrees: Others more Weſtward make it 19 degrees 30 minutes. And Jodocus Hondius begining the Meridian at the Iſle Pico, one of the Azores, makes London to be in Longitude 27 degr. 40 min. but I following Mr. Emery Mulineux, according to his great Globes, doe account the Longitude from the Weſtermoſt parts of S. Michaels, another Iſle of the Azores, the moſt of which Iſle is 50 minutes in Longitude, and from the Weſtermoſt part thereof, the Longitude of London is 25 degrees, 40 minutes, which in effect is not much different from any of the others: Note, that the Longitude is counted from the Meridian paſſing over the aforeſaid place Eaſterwards into a continuall progreſſion, to the end of 360, which is the whole Circumference of the World. Laticude is counted from the Equinoctiall to the end of 90 Degrées on each ſide thereof: and where the Letter S. is after any number, it ſhews the place to have ſo many degrées and minutes of South Latitude, all the reſt having no Letter adjoyning, have North Latitude; the whole being ſet in Alphabeticall order for the readier finding of any place therein conteined: And where the Longitude and Latitude of any Kingdome is ſet down, noted with this ſyllable Reg. it expreſſeth the middle thereof. Further, at the end of ſuch places, as begin with one Letter, is left a ſpace wherein the Travailer may inſert ſuch places, whereof the Longitude and Latitude is to him known, and not herein expreſſed.

A Table

# A Table of the *Longitude* and *Latitude*,

## of all the Notable Places of the World, newly Corrected and Inlarged by Mr. *T. Stern* Globe maker.

| A | Longit. | Latitude |
|---|---|---|
| Acapulco | 265 0 | 19 00 |
| Acartii an Il. | 329 1 | 52 1 |
| Azores an Il. | 357 1 | 39 1 |
| Achinguas | 101 30 | 5 30 S |
| Actiin | 132 30 | 34 40 |
| Aden | 81 12 | 50 1 S |
| Adra | 50 11 | 25 1 S |
| Adu | 105 41 | 5 41 |
| Egypt | 64 3 | 30 1 |
| Africa Reg. | 40 1 | 10 1 |
| Agonam | 162 21 | 38 1 |
| Agragam | 144 29 | 8 21 S |
| Aguada fegura | 253 29 | 24 1 |
| Aquel la de pozos | 245 20 | 28 00 |
| Alina a Mountain | 98 41 | 54 20 |
| Alacranes | 283 5 | 22 1 |
| Alagoa | 58 41 | 29 41 S |
| Albion nova | 235 1 | 50 00 |
| Albion | 109 29 | 25 29 |
| Albolam | 25 29 | 35 29 |
| Alburough | 26 25 | 52 20 |
| Alepo | 72 29 | 38 1 |
| Alcada | 23 4 | 40 29 |
| Alexandria | 65 1 | 31 21 |
| Alexandria | 73 11 | 36 21 |
| Algeziu | 16 0 | 29 1 |
| Algiero | 33 1 | 35 21 |
| Algueseer | 63 41 | 26 51 |
| Alicante | 28 41 | 39 1 |
| Alipea | 76 30 | 13 21 S |
| Alsour | 44 21 | 38 29 |
| Alima | 108 51 | 31 1 |

| A | Longit. | Latitnd |
|---|---|---|
| Alleteuja | 70 21 | 10 1 |
| Almedina | 34 1 | 33 41 |
| Alpes a Mountain | 41 29 | 47 29 |
| Alsigubas | 147 11 | 38 41 |
| Amazen | 45 29 | 12 41 |
| Amazons Reg. | 323 1 | 13 1 |
| Las Amazons | 312 29 | 12 29 S |
| Ammon | 59 41 | 27 11 |
| Amsterdam | 33 1 | 51 29 |
| Averie a Mount | 116 00 | 54 9 |
| Ancona | 63 11 | 1 11 |
| Ancona | 43 29 | 43 51 |
| Amboina | 161 54 | 3 20 |
| Abona | 164 30 | 6 10 S |
| Amiona | 75 20 | 12 40 S |
| Andernopoly | 58 11 | 44 41 |
| St. Andre | 170 29 | 12 1 |
| St. Andre | 22 11 | 56 21 |
| St. Andrews | 62 11 | 61 11 |
| Las Anegadas | 296 00 | 50 1 S |
| Angier | 24 41 | 47 35 |
| Anglesey | 19 51 | 54 0 |
| Anglia Reg. | 23 00 | 53 0 |
| Angolesme | 27 1 | 46 0 |
| Antiochia | 300 5 | 6 40 |
| Antipara | 74 2 | 25 20 S |
| Antwerpen | 31 20 | 50 30 |
| Arabia Fœlix | 83 00 | 25 0 |
| Arabia Defart | 77 00 | 30 0 |
| Argier | 32 50 | 35 40 |
| Armenia Reg. | 76 00 | 41 0 |
| Arnalurs Mount | 35 00 | 11 30 S |
| Ascension | 353 20 | 18 50 |

| A B | Longit. | Latitude |
|---|---|---|
| La Aſcenſion | 15 30 | 8 0 S |
| Aſſyria Reg. | 85 0 | 36 0 |
| Athens | 56 10 | 40 0 |
| Avero | 17 30 | 41 10 |
| Auguſtine | 293 0 | 29 50 |
| Ausburgh | 38 40 | 48 30 |
| Azura Mountain | 59 0 | 22 40 |
| Amiens | 28 30 | 49 40 |
| **B** | | |
| BAntam | 140 0 | 5 40 S |
| Babylon | 82 20 | 33 0 |
| Babel mandel | 80 0 | 12 50 |
| Bachu | 88 50 | 42 0 |
| Baſtriana Reg. | 115 0 | 38 30 |
| Bagaſus a Lake | 77 10 | 50 40 |
| Baboram an Ile bays | 87 20 | 27 30 |
| Bay Anegada | 319 50 | 40 20 S |
| Bay de bixos anega- | 321 30 | 39 50 S |
| Bianza (dos | 149 25 | 3 0 S |
| Batavia | 123 0 | 3 20 S |
| Bay a Dalagoa | 56 10 | 32 10 S |
| Bay de Fumos | 240 20 | 36 0 |
| Bay de S. Migell | 39 30 | 8 40 |
| Bay Oc ſinora | 312 30 | 41 0 |
| Bay de Pinos | 233 0 | 40 30 |
| Bay langos | 18 0 | 37 30 |
| Bacalaio | 335 4 | 48 28 |
| Bayona | 17 20 | 42 10 |
| Bayone | 25 30 | 44 0 |
| Baſſera | 82 4 | 31 10 |
| Bamberg | 39 15 | 50 10 |
| Bandu. | 173 30 | 33 0 |
| Bax dolos pergos | 345 30 | 20 0 S |
| Barbades | 328 20 | 12 40 |
| La Barbada | 192 50 | 1 50 S |
| Barlingas | 16 20 | 39 30 |
| Barnagoſſos Reg. | 70 0 | 13 0 |
| St. Bartholme | 194 30 | 14 0 |

| B | Longit. | Latitude |
|---|---|---|
| Bermudes | 316 10 | 32 30 |
| Baſel | 37 10 | 47 50 |
| Beciaſa | 65 0 | 10 30 |
| Beil | 76 15 | 27 10 |
| Belef | 69 0 | 51 40 |
| Beliſſe | 21 30 | 47 0 |
| Belt | 52 40 | 50 0 |
| Bengala Reg. | 126 0 | 26 30 |
| Benichao | 136 0 | 3 50 |
| Benin Reg. | 41 0 | 7 40 |
| Bepirus a mount | 143 0 | 34 0 |
| Bepirus a River | 138 20 | 34 0 |
| Berga | 40 10 | 62 50 |
| Bergen | 30 30 | 60 50 |
| Barwick | 22 50 | 55 50 |
| Berbel | 138 50 | 25 40 |
| Baiſer Reg. | 50 0 | 4 0 |
| Braligrod. | 58 20 | 47 30 |
| Bilbao | 23 30 | 43 0 |
| Blaskey | 12 0 | 51 40 |
| Blaves | 31 10 | 42 0 |
| Blaver | 21 15 | 47 50 |
| Bloe | 5 30 | 67 0 |
| Borneo | 145 30 | 5 10 |
| Bornebolm | 40 50 | 55 30 |
| Bovenberghen | 34 20 | 56 30 |
| Brandenbergh | 42 30 | 52 50 |
| Braſil | 5 10 | 51 20 |
| Braſilia Reg. | 345 0 | 10 0 S |
| Braya | 74 30 | 0 30 |
| Breſt | 20 0 | 48 30 |
| Bruage. | 25 30 | 45 50 |
| Bruges | 29 0 | 47 30 |
| Buda | 48 0 | 47 20 |
| Burdiaux | 26 0 | 45 10 |
| Briſtow | 22 50 | 51 35 |
| Brachipule point in Wales. | 21 25 | 53 0 |

| B C | Longit. | Latitude |
|---|---|---|
| Bachapro | 31 00 | 59 50 |
| Brullels | 30 50 | 51 00 |
| Bârcelona | 28 15 | 41 10 |
| Burlings | 16 00 | 39 38 |
| **C** | | |
| **Capes** | | |
| Cape S. Francis | 335 00 | 48 5 |
| Cap Raso | 334 40 | 46 28 |
| Cap Massisaco | 24 00 | 43 32 |
| Cap de las penes | 21 00 | 43 35 |
| Cap de Almide | 346 50 | 1 00 S |
| Cap de Amber | 83 30 | 12 00 S |
| Cap de St. Anton. | 289 15 | 22 50 |
| Cap cleere | 14 10 | 51 9 |
| Cap de S. Antoni | 74 30 | 17 00 S |
| Cap de St. Auguſt | 162 00 | 6 30 |
| Cap de St. Auguſt | 354 00 | 8 30 S |
| Cap baxo | 328 00 | 4 20 |
| Cap de las baxas | 19 41 | 15 29 |
| Cap Bedford | 320 1 | 65 29 |
| Cap blanco | 273 19 | 25 21 S |
| Cap blanco | 281 19 | 10 29 |
| Cap blanco | 331 21 | 4 26 |
| Cap blanco | 334 21 | 52 1 |
| Cap blanco | 289 41 | 2 21 S |
| Cap blanco | 151 1 | 22 41 |
| Cap brava | 275 1 | 27 29 |
| Cap de Breton | 331 1 | 45 41 |
| Cap cameron | 287 21 | 25 41 |
| Cap comorin | 115 15 | 7 30 |
| Cap cantin | 17 1 | 32 11 |
| Cap de St. Kather. | 41 1 | 1 1 S |
| Cap Cod | 317 00 | 41 00 |
| Cap de Cro | 31 29 | 42 11 |
| Cap de croce | 65 21 | 48 21 |
| Cap Defierto | 281 21 | 29 21 |
| Cap Desperance | 324 29 | 51 1 |
| Cap St. Domingo | 315 21 | 46 41 S |

| C | Longit. | Latitud |
|---|---|---|
| Cap falso | 49 31 | 34 40 S |
| Cap feare | 305 11 | 32 29 |
| Cap fœlix | 84 29 | 14 11 |
| Cap finisterre | 16 1 | 43 11 |
| Cap Florida | 293 21 | 25 29 |
| Cap Formoso | 28 1 | 5 1 |
| Cap Froward | 302 39 | 53 21 |
| Cap de garo | 26 39 | 36 51 S |
| Cap de St. Helena | 326 11 | 36 11 S |
| Cap de Santiago | 309 1 | 37 29 |
| Cap St. John | 62 29 | 87 29 |
| Cap de Krin | 13 1 | 53 41 |
| Cap de St. Maria | 77 29 | 24 1 S |
| Cap de Majo | 82 52 | 15 51 S |
| Cap de S. Maria | 327 11 | 35 11 S |
| Cap de St. Maria | 9 41 | 21 41 |
| Cap de la Mola | 36 51 | 6 29 |
| Cap de nombre de Jesus | 308 11 | 53 1 S |
| Cap Ortegall | 18 29 | 44 11 |
| Cap de palmas | 348 11 | 1 19 |
| Cap de St. Paul | 32 00 | 5 50 |
| Cap de pescadores | 277 40 | 28 00 |
| Cap del plate | 352 50 | 5 00 S |
| Cap primero | 42 30 | 2 20 S |
| Cap de 3 points | 28 30 | 5 00 |
| Cap de puntas | 315 20 | 10 40 |
| Cap Daduillius | 42 1 | 34 30 |
| Cap de R: zo | 334 30 | 46 20 |
| Cap salida | 74 00 | 26 10 S |
| Cap de spigiel | 353 20 | 7 20 S |
| Cap de stavola | 12 20 | 54 00 |
| Cap torriga | 11 30 | 18 20 |
| Cap la vela | 305 10 | 11 50 |
| Cap S. Vincent | 302 20 | 53 40 S |
| Cap de Virgin M. | 308 00 | 52 10 S |
| Cap de Vittoria | 297 30 | 52 00 S |
| Cap passaro | 46 29 | 36 51 |

| C | Longit. | Latitude |
|---|---|---|
| Cap Resalgate | 96 21 | 22 21 |
| Cap ra'o | 317 40 | 8 00 |
| Cap roxent | 16 29 | 38 50 |
| Cap roxo | 11 1 | 12 00 |
| Cap of good hope | 50 30 | 35 40 S |
| Cap del spirito san. | 161 11 | 13 11 |
| Cap S. Vincent | 17 00 | 37 00 |
| Cap Verd | 9 51 | 14 20 |
| Cap de bona vesta | 334 21 | 49 11 |
| Cap Walsingham | 321 . 1 | 63 41 |
| Campon Reg. | 136 1 | 47 00 |
| Cairo | 67 29 | 30 00 |
| Calamita | 67 41 | 48 10 |
| Caldy | 20 1 | 50 40 |
| Calecut | 112 41 | 10 29 |
| Calice in France | 29 10 | 50 40 |
| Calibia Reg. | 142 10 | 36 20 |
| California | 245 00 | 30 00 |
| Camanor | 300 20 | 16 30 S |
| Cambaiba | 150 00 | 8 10 S |
| Cembaya | 110 00 | 22 00 |
| Camboya Reg. | 142 20 | 11 40 |
| Capiapa | 304 50 | 34 00 S |
| Casma a River | 121 40 | 61 00 |
| Castrum Portugal | 57 10 | 20 20 S |
| Casan | 86 20 | 56 30 |
| Chaga | 56 00 | 6 20 S |
| Chialo | 56 20 | 7 00 S |
| Chilimazata | 294 30 | 6 30 S |
| Chio | 58 30 | 40 30 |
| Chiguilamba | 305 30 | 17 00 S |
| Coalo | 65 00 | 21 30 |
| Coile | 48 20 | 3 10 S |
| Cora | 85 10 | 19 20 |
| Coronades | 296 30 | 45 00 S |
| Corposanto | 84 10 | 7 30 S |
| Cumana | 313 30 | 7 00 |
| Cusco Reg. | 297 20 | 13 30 S |

| C | Longit. | Latitude |
|---|---|---|
| Cales in Spain | 20 51 | 36 10 |
| Cambalu | 161 11 | 51 40 |
| Canada | 305 11 | 50 21 |
| Canaria Grand | 9 29 | 27 21 |
| Canda | 59 29 | 35 21 |
| Caribes | 316 11 | 7 00 |
| Cartagena | 300 1 | 20 11 |
| Cartagena | 28 21 | 38 20 |
| Cartago | 299 29 | 3 11 |
| Casena Reg. | 38 21 | 17 11 |
| Casser Reg. | 132 1 | 47 1 |
| Cataio Reg. | 150 1 | 53 1 |
| Catnes | 22 9 | 58 29 |
| Carwick | 41 11 | 69 11 |
| Chester in England | 21 29 | 53 51 |
| Chichester | 24 11 | 51 00 |
| Chidlies cape | 326 41 | 67 29 S |
| Chily Reg. | 305 00 | 30 1 |
| Chirman Reg. | 96 00 | 28 29 |
| Cirena | 53 29 | 32 00 |
| Cypres | 68 | 437 30 |
| Clearemont | 30 55 | 45 51 |
| Coeas a Mountain | 79 00 | 47 29 |
| Cochin | 114 00 | 9 14 |
| Callao Reg. | 310 00 | 16 00 S |
| Comogory | 62 41 | 63 41 |
| Colue | 34 00 | 51 41 |
| Commania Reg. | 86 00 | 51 00 |
| Congu | 147 21 | 49 11 |
| Coninxbergh | 49 11 | 55 29 |
| Constantinople | 61 20 | 44 40 |
| Copen-hage | 38 29 | 55 51 |
| Corasan Reg. | 108 1 | 37 00 |
| Cork in Ireland | 15 41 | 51 41 |
| Corfu an Island | 22 00 | 39 19 |
| Corinth | 54 21 | 39 00 |
| Corsica | 38 11 | 42 00 |
| Coram Reg. | 230 00 | 51 00. |

| C D E | Longit. | Latitude |
|---|---|---|
| Cracow | 48 29 | 50 00 |
| Cuba | 196 00 | 31 41 |
| Earle of Cumberlands Isles | 316 00 | 63 21 |
| Cusitan Reg. | 87 00 | 32 00 |
| Corcugh | 15 35 | 53 45 |
| Cambridge | 23 50 | 52 14 |
| D | | |
| Angali Reg. | 78 00 | 11 00 |
| Diu | 107 3 | 20 42 |
| Damon | 108 8 | 19 20 |
| Dsbol | 109 6 | 17 45 |
| Dawina | 74 30 | 62 10 |
| Dager Oort | 48 41 | 59 41 |
| Dalacia | 77 00 | 14 21 |
| Damascus | 74 25 | 35 00 |
| Dantzick | 46 00 | 55 00 |
| L. Dartes Isle | 327 50 | 68 21 |
| Derwinda | 47 52 | 37 26 |
| Deneaner | 33 29 | 51 51 |
| Diep | 28 41 | 49 29 |
| Dires Cape | 321 29 | 64 51 |
| Dominica | 319 41 | 14 00 |
| Don a River | 75 00 | 53 21 |
| Donecx a River | 71 20 | 51 00 |
| Dotow | 58 00 | 51 29 |
| Dover | 28 12 | 51 00 |
| Dublin | 16 41 | 53 11 |
| Dumaran | 150 00 | 8 41 |
| Duy | 34 29 | 59 21 |
| Duyhe | 56 29 | 50 29 |
| Dasis Sotaights | 324 1 | 64 00 |
| Derby | 24 5 | 52 45 |
| Dunkirk | 29 10 | 51 12 |
| E | | |
| Baida | 60 1 | 25 29 |
| Edinborough | 22 1 | 55 51 |
| Ely | 25 20 | 52 40 |

| E F | Longit. | Latitude |
|---|---|---|
| Elior | 26 20 | 10 10 |
| Queen Elizabeths Forcland | 337 00 | 61 30 |
| Embden | 34 10 | 53 10 |
| Ens | 43 00 | 48 30 |
| Ens | 74 10 | 37 30 |
| Ephesus | 60 30 | 39 40 |
| Ergas | 86 00 | 38 00 |
| Eubaya | 56 13 | 41 00 |
| Euphrates a River | 76 00 | 40 00 |
| Europa Reg. | 55 40 | 51 00 |
| Exeter | 22 10 | 51 5 |
| Enchuisen | 31 40 | 52 54 |
| F | | |
| Alsterhood | 40 00 | 56 00 |
| Famagosta | 69 20 | 37 30 |
| Farrelloncs | 294 20 | 11 40 S |
| Fargana | 114 40 | 46 00 |
| Fame | 16 20 | 61 30 |
| Cape Farache | 86 50 | 15 40 |
| Falo | 75 50 | 45 40 |
| Farnasa | 38 10 | 30 10 |
| Farnandobuck | 351 40 | 9 20 S |
| Fees Reg. | 21 50 | 32 50 |
| Fierro | 6 20 | 26 30 |
| Finmark | 47 00 | 69 30 |
| Flambrough head | 25 20 | 54 00 |
| Flensburgh | 36 40 | 55 00 |
| Flescory | 32 00 | 58 00 |
| Fly | 32 00 | 53 33 |
| Florence | 41 10 | 43 40 |
| Flores Island | 353 40 | 39 20 |
| Florida Reg. | 292 00 | 31 00 |
| Flucen | 38 40 | 66 30 |
| La Formanos | 310 30 | 40 40 |
| Formentera | 31 10 | 38 50 |

| F G | Longit. | | Latitude | | |
|---|---|---|---|---|---|
| Forteventura | 11 | 00 | 28 | 00 | |
| Foyle | 15 | 50 | 55 | 30 | |
| Frailes | 314 | 30 | 11 | 20 | |
| Franckfurt | 36 | 30 | 50 | 00 | |
| Frisland | 351 | 30 | 62 | 00 | |
| Frobishers strait | 331 | 20 | 64 | 00 | |
| A furious Overfall | 322 | 30 | 60 | 00 | |
| Farre Islands | 17 | 00 | 62 | 10 | |
| Farnill Ile | 24 | 45 | 60 | 00 | |
| Ferando | 164 | 00 | 32 | 35 | |
| **G** | | | | | |
| GAgo Reg. | 25 | 00 | 8 | 30 | |
| Galathia | 37 | 20 | 37 | 00 | |
| Gambra a Riv. | 12 | 00 | 13 | 10 | |
| Gaunt | 30 | 20 | 50 | 40 | |
| Garamantica | 51 | 30 | 16 | 00 | |
| Garnesey | 22 | 20 | 49 | 40 | |
| Gaza | 70 | 50 | 33 | 10 | |
| Gamba | 64 | 40 | 17 | 30 | S |
| Gargiza | 62 | 40 | 12 | 00 | S |
| Gemeneeora | 118 | 40 | 6 | 00 | |
| Geneva | 33 | 40 | 46 | 20 | |
| Genua | 37 | 50 | 45 | 00 | |
| Genua | 15 | 20 | 16 | 00 | |
| Gerguth Reg. | 153 | 00 | 57 | 00 | |
| Germanarco | 40 | 00 | 51 | 00 | |
| Getselvin | 24 | 30 | 32 | 20 | |
| Gomera | 7 | 30 | 17 | 00 | |
| Ghir a River | 25 | 30 | 22 | 00 | |
| Giamber | 18 | 1 | 33 | 41 | |
| Gilberts sound | 326 | 51 | 67 | 1 | |
| Giras a River | 41 | 21 | 20 | 11 | |
| Galloway | 15 | 49 | 53 | 15 | |
| Goa | 102 | 21 | 15 | 14 | |
| Glasgow | 29 | 00 | 57 | 00 | |
| Golfo de Bengala | 125 | 00 | 15 | 00 | |
| Golfo de S. Helen | 48 | 41 | 33 | 29 | S |

| G H | Longit. | | Latitude | | |
|---|---|---|---|---|---|
| Golfo de la India | 44 | 21 | 3 | 14 | S |
| Golfo de los negro | 350 | 30 | 2 | 00 | S |
| Golfo del Rey | 40 | 41 | 5 | 30 | |
| Golfo de todos santos | 345 | 30 | 1 | 41 | S |
| Golfo de S. Anton. | 46 | 20 | 26 | 00 | S |
| Golfo frio | 45 | 30 | 20 | 00 | S |
| Goteland | 45 | 21 | 57 | 30 | |
| Gozo | 58 | 20 | 34 | 41 | |
| Granada | 318 | 20 | 11 | 00 | |
| Granata | 23 | 30 | 38 | 00 | |
| Grecia Reg. | 54 | 00 | 00 | 06 | |
| Gratiosa | 357 | 30 | 39 | 2 | |
| Groninghen | 32 | 11 | 53 | 00 | |
| Groenland | 00 | 00 | 75 | 00 | |
| Groy | 21 | 00 | 47 | 21 | |
| Guinea nova | 180 | 00 | 5 | 00 | S |
| Guinea Reg. | 18 | 00 | 9 | 00 | |
| Gunogona | 67 | 30 | 6 | 00 | |
| Gibralter straights | 21 | 30 | 36 | 00 | |
| Greenland | 50 | 00 | 77 | 00 | |
| **H** | | | | | |
| HAles Iland | 337 | 30 | 63 | 00 | |
| Haliber | 78 | 41 | 20 | 1 | |
| Halics | 52 | 51 | 48 | 41 | |
| Hambrough | 37 | 11 | 53 | 21 | |
| Hartlepool | 24 | 00 | 55 | 21 | |
| Harwich | 27 | 29 | 52 | 00 | |
| Havana | 292 | 11 | 23 | 00 | |
| Hebrides | 15 | 20 | 58 | 00 | |
| Heydelbergh | 36 | 00 | 49 | 00 | |
| Heist | 23 | 29 | 46 | 29 | |
| Heishant | 19 | 29 | 48 | 41 | |
| Heptapolis | 324 | 29 | 25 | 21 | |
| Hercules Pillers | 69 | 21 | 32 | 11 | |
| Hellichland | 33 | 51 | 66 | 00 | |
| Hercania Reg. | 100 | 00 | 40 | 00 | |

| H I | Longit. | Latitude |
|---|---|---|
| Hiſpania Reg. | 25 00 | 40 00 |
| Nova Hiſpania | 280 00 | 13 29 |
| Hiſpaniola | 306 00 | 18 29 |
| Holindall | 36 11 | 61 1 |
| Honts Oort | 48 30 | 59 1 |
| Horne | 12 10 | 66 10 |
| Hull | 25 21 | 53 41 |
| Hungaria | 50 00 | 48 1 |
| Hidaſpes a River | 124 00 | 33 21 |
| Hipaſis a river | 124 00 | 33 1 |
| Helin-head | 15 00 | 55 15 |
| Hereford | 22 38 | 52 12 |
| Heel of Danthick. | 46 10 | 55 40 |
| I | | |
| IAmbie | 121 30 | 1 15 S |
| Jacatra | 140 co | 6 00 S |
| Jamaica | 298 30 | 17 00 |
| Jaſques in Perſia | 94 00 | 25 40 |
| Japan | 169 00 | 38 00 |
| Jerſey Iſland | 23 00 | 49 20 |
| Java major | 140 00 | 9 00 S |
| Java minor | 151 00 | 80 00 S |
| Jazin | 77 30 | 20 30 |
| Japara | 141 20 | 7 40 S |
| Jerico | 73 [illegible] | 33 00 |
| Jeruſalem | 72 21 | 33 00 |
| Ilemens a River | 105 00 | 27 00 |
| Imaus a mountain | 128 00 | 39 00 |
| India Orientall | 135 00 | 26 00 |
| Indus a river | 115 29 | 26 00 |
| Inſpurg Iſlands | 40 41 | 47 50 |
| The three Iſlands | 169 21 | 40 2 S |
| Ile de Avis | 310 30 | 11 30 |
| Ile de Avis | 173 50 | 4 30 |
| Ile de baſtinado | 293 30 | 10 30 |
| Ile Brava | 1 20 | 14 20 |
| Iſlas de coroles | 194 40 | 9 50 |

| I | Longit. | Latitude |
|---|---|---|
| Ile Deſierto | 178 00 | 31 1 |
| Ile del Fuego | 2 30 | 14 21 |
| Ile de los fuegos | 181 29 | 27 40 |
| Ile de los Galopegos majores | 281 10 | 4 00 |
| Ile de los Galopegos minores | 277 30 | 1 10. |
| Ile de Hombres blancos. | 169 20 | 5 41 S |
| Ile de St. Jago | 158 20 | 8 00 S |
| Ile de St. Ivan | 164 30 | 6 00 |
| Ile de los Ladrones. | 177 21 | 15 11 |
| Ile de los Lobos | 307 41 | 40 21 S |
| Ile de St. Maria | 296 29 | 37 2 |
| Ile de Martin vaz | 11 21 | 21 1 S |
| Ile de Mayo | 4 29 | 13 29 |
| Ile St. Michael | 0 00 | 38 25 |
| Ile de Negros | 155 29 | 10 29 S |
| Iland of Fowles | 334 00 | 50 00 |
| Ile de Orleance | 312 00 | 50 29 |
| Ile de Pajaros | 314 00 | 12 41 |
| Ile de palmas | 163 21 | 6 00 |
| Ile de Pazaros | 198 51 | 8 51 |
| Ile de pazaros | 234 21 | 28 00 |
| Ile de Pearles | 293 10 | 7 00 |
| Ile de Pinos | 292 21 | 21 29 |
| Ile de Reis | 162 00 | 25 20 |
| Ile of Salt | 5 00 | 16 29 |
| Salomon Iland | 204 40 | 10 00 S |
| Ile Solis | 347 00 | 10 29 |
| Ile St. Thomas | 38 00 | 00 00 |
| Ile St. Thomas | 252 00 | 20 11 |
| Ile de Verde | 353 51 | 15 29 |
| Ile de St. Vincent | 175 50 | 8 00 |
| Ile de S. Vincent | 73 21 | 20 29 S |
| Ile de St. Catalina | 334 10 | 27 30 S |
| Ile de S. Cedros | 240 30 | 29 50 S |

| I K L | Longit. | Latitud. |
|---|---|---|
| Isle de Fernan lare | 354 20 | 2 20 S |
| Isle de Lima | 295 10 | 22 00 S |
| Isle Seeas | 46 20 | 29 30 S |
| Isle de Tristan de Acunia | 26 30 | 36 00 S |
| Joam | 135 00 | 7 29 |
| Joleso | 14 29 | 6 00 |
| Ipswich | 27 12 | 52 22 |
| Joppe | 71 21 | 34 00 |
| Isebella | 305 21 | 18 51 |
| Island | 8 00 | 66 00 |
| Iraly Reg. | 42 29 | 43 00 |
| Ireland | 16 00 | 53 29 |
| Jucatan Reg. | 283 00 | 18 00 |
| Jugor | 138 00 | 7 50 |
| Juica | 31 21 | 39 30 |
| Julibella | 61 00 | 1 30 |
| **K** | | |
| Almuchy in Tartaria | 95 00 | 51 00 |
| Karakithath R | 119 00 | 51 00 |
| Kasakky Tartaria | 103 00 | 51 00 |
| Kichnis Reg. | 110 00 | 57 00 |
| Kithay a Lake | 123 31 | 53 00 |
| Kola | 54 51 | 69 00 |
| Kolenig | 4 11 | 65 10 |
| Kosar a River | 96 40 | 49 00 |
| Kintale | 19 30 | 56 45 |
| Kinsaile | 15 3 | 52 35 |
| **L** | | |
| Acienna | 24 50 | 39 36 |
| Ladena | 53 30 | 41 31 |
| Ladoga | 62 11 | 61 40 |
| Lago de los Coronados | 295 00 | 44 1 S |
| Lampsa | 36 21 | 33 00 |
| Lanceroza | 11 41 | 29 30 |

| L | Longit. | Latitude |
|---|---|---|
| Lanow | 51 11 | 52 10 |
| Laredo | 22 51 | 43 00 |
| Larisa | 70 00 | 33 00 |
| Larta | 53 00 | 46 00 |
| Lake de Goulette | 306 40 | 48 00 |
| Lacus Aritibus | 131 00 | 60 10 |
| Lacus Fatsus | 137 40 | 47 30 |
| Leon | 21 11 | 42 15 |
| Leon | 283 41 | 11 21 |
| Leopolis | 52 51 | 49 2 |
| Lepin | 98 00 | 58 41 |
| Legujo major | 165 00 | 28 00 |
| Legujo minor | 158 41 | 22 00 |
| Lerida | 28 21 | 41 30 |
| Lester point | 335 00 | 62 00 |
| Lima | 296 41 | 23 30 S |
| Limoria | 72 11 | 34 20 |
| Lymosa | 43 29 | 34 50 |
| Lyons | 32 41 | 45 40 |
| Ligorn, or Liorne | 40 21 | 43 30 |
| Lisbon | 17 29 | 39 11 |
| Lyzard | 18 30 | 50 10 |
| London | 25 50 | 51 30 |
| London coast | 326 11 | 72 10 |
| Lepeso | 74 1 | 49 41 |
| Loyre a River | 24 14 | 47 41 |
| Longstound | 34 30 | 58 55 |
| Lubeck | 38 2 | 53 51 |
| Lucia | 42 11 | 52 00 |
| Lucky | 64 00 | 58 21 |
| L. Landys Isles | 320 00 | 61 00 |
| Luna a Mountain | 60 00 | 16 00 |
| Lundy | 19 2 | 51 00 |
| Luroke | 54 00 | 50 21 |
| Luson an Island | 156 00 | 17 00 |
| Lybia | 33 00 | 23 30 |
| Lin | 29 25 | 52 48 |
| Lincoln | 25 25 | 53 22 |

| M | Longit. | | Latitude | | |
|---|---|---|---|---|---|
| M | | | | | |
| Aroga | 62 | 41 | 13 | 30 | S |
| Machian | 106 | 41 | 0 | 29 | |
| Machoenta | 93 | 51 | 33 | 41 | |
| Macsin Iland | 93 | 30 | 75 | 30 | |
| Macyra an Iland | 93 | 0 | 19 | 40 | |
| Madera Ilands | 8 | 11 | 31 | 29 | |
| Meotis Palus | 71 | 30 | 39 | 20 | |
| Magadaxo | 78 | 0 | 5 | 11 | |
| Magalo | 71 | 20 | 9 | 29 | S |
| Marda | 2 | 40 | 46 | 40 | |
| Magellan Streights | 305 | 0 | 53 | 25 | S |
| Majorca Iland | 31 | 31 | 30 | 0 | |
| Malabrigo | 178 | 51 | 26 | 0 | |
| Malaca | 137 | 0 | 3 | 30 | |
| Malaga | 23 | 51 | 37 | 21 | |
| Maldivar an Iland | 113 | 0 | 3 | 0 | |
| Malorca | 31 | 31 | 30 | 0 | |
| Malta an Iland | 46 | 0 | 35 | 31 | |
| Man an Iland | 19 | 0 | 54 | 51 | |
| Nosambique | 70 | 0 | 14 | 32 | |
| Magador | 16 | 20 | 31 | 50 | |
| Mamora | 155 | 6 | 0 | 30 | |
| Mombasa | 72 | 0 | 4 | 50 | S |
| Mangesia | 61 | 92 | 41 | 9 | |
| Mangichina | 150 | 0 | 37 | 0 | |
| Manica | 62 | 31 | 23 | 29 | S |
| Manicongo Reg. | 46 | 0 | 5 | 0 | |
| Maniola Iland | 140 | 30 | 3 | 50 | S |
| Merchant Ile | 330 | 0 | 68 | 21 | |
| Mare de Bachuor the Caspean Sea | 92 | 0 | 45 | 0 | |
| Mare Congelatum | 345 | 0 | 64 | 0 | |
| Mare de India | 120 | 0 | 10 | 0 | S |
| Mare major | 68 | 0 | 46 | 0 | |
| Mare mediterran. | 59 | 0 | 35 | 0 | |
| Mare rubrum | 75 | 0 | 20 | 0 | |
| Mare vermeio | 255 | 0 | 26 | 0 | |

| M | Longi | | atitude | | |
|---|---|---|---|---|---|
| Mare delizur | 270 | 00 | 15 | 00 | |
| Margarita | 314 | 11 | 10 | 50 | |
| Marigalante | 320 | 00 | 15 | 00 | |
| Marmos | 306 | 21 | 40 | 40 | |
| Marocco | 20 | 00 | 30 | 19 | |
| Marcellis | 33 | 51 | 43 | 40 | |
| Masalag | 23 | 29 | 30 | 20 | |
| Milford Haven | 20 | 25 | 51 | 48 | |
| Mastagan | 30 | 1 | 35 | 20 | |
| Mazaker | 167 | 00 | 33 | 00 | |
| Madagascar | 77 | 00 | 19 | 5 | S |
| Marecapane | 312 | 10 | 8 | 00 | |
| Meander a Mountain | 152 | 00 | 31 | 30 | |
| Maleſtream | 36 | 00 | 67 | 22 | |
| Meb | 46 | 29 | 54 | 30 | |
| Medina cely | 23 | 29 | 41 | 10 | |
| Medina talnaby | 37 | 00 | 27 | 20 | |
| Manilia | 156 | 00 | 3 | 16 | |
| Medino | 98 | 29 | 36 | 29 | |
| Middleburg | 20 | 40 | 52 | 00 | |
| Meiſſen | 41 | 00 | 51 | 10 | |
| Melinde Reg. | 71 | 21 | 3 | 20 | S |
| Melley Reg. | 15 | 41 | 12 | 00 | |
| Melvisig | 48 | 1 | 54 | 50 | |
| Mentz | 35 | 51 | 50 | 00 | |
| Mesher | 85 | 29 | 52 | 50 | |
| Mesopotamia | 78 | 1 | 35 | 00 | |
| Messana | 45 | 51 | 37 | 50 | |
| Metz | 33 | 29 | 49 | 45 | |
| Mien Reg. | 136 | 1 | 31 | 00 | |
| Mienskow | 56 | 41 | 54 | 50 | |
| Millain | 38 | 29 | 46 | 10 | |
| Minorca Ile. | 34 | 26 | 40 | 00 | |
| Moldavia Reg. | 55 | 00 | 46 | 00 | |
| Molines. | 30 | 21 | 46 | 40 | |
| Mollucca Iland | 160 | 41 | 1 | 00 | |
| Memorancie | 130 | 00 | 47 | 00 | |
| Mongul Reg. | 160 | 00 | 61 | 30 | |

| M N | Longit. | Latitude |
|---|---|---|
| Monte de Branid | 47 11 | 30 15 S |
| Mount Frogoso | 344 00 | 12 20 S |
| Mont Negro | 44 41 | 17 00 S |
| Mont Raleigh | 320 30 | 65 00 |
| Mont Royall | 301 00 | 45 40 |
| Morea Reg. | 54 30 | 38 00 |
| Mosaick | 68 50 | 55 00 |
| Mosambique Reg. | 70 20 | 14 40 S |
| Muscovia Reg. | 80 00 | 59 00 |
| Moskow | 70 00 | 55 40 |
| Mossa | 84 30 | 35 00 |
| Mossull | 84 00 | 34 55 |
| Mozena | 24 20 | 34 30 |
| Moa | 96 36 | 21 31 |
| Minas | 165 00 | 36 20 |
| Meseneck | 69 50 | 51 30 |
| Munster | 35 00 | 52 10 |
| **N** | | |
| NAbarz | 79 50 | 50 50 |
| NaimanReg. | 140 00 | 64 00 |
| Naynen | 31 10 | 50 00 |
| Nantes | 24 10 | 47 50 |
| Napoly | 45 00 | 41 00 |
| Napoly | 55 10 | 38 00 |
| Napthaly | 73 00 | 34 30 |
| Narbona | 30 20 | 43 20 |
| Nardenborg | 47 10 | 67 05 |
| Narve | 56 10 | 60 00 |
| Narvare | 26 40 | 41 39 |
| Naseph | 110 30 | 43 00 |
| Natoria Reg. | 66 00 | 41 00 |
| Nazareth | 72 40 | 34 10 |
| Newcastle | 23 10 | 55 20 |
| New-found Land | 334 20 | 46 30 |
| Nicaria | 59 30 | 39 30 |
| Nicoberan Island | 130 30 | 6 40 |
| Nicomedia | 63 30 | 44 20 |
| Nicoplis | 56 30 | 45 00 |

| N O | Longit. | Latitude |
|---|---|---|
| New England | 315 00 | 43 00 |
| New Plimouth | 315 00 | 41 37 |
| New Salem | 315 10 | 42 35 |
| Nieflot | 57 40 | 59 50 |
| Milus a River | 67 20 | 32 00 |
| Ninus | 82 20 | 37 00 |
| Nisa | 36 10 | 44 00 |
| Nissa | 45 30 | 50 30 |
| Naze in Norway | 31 00 | 58 05 |
| Noes a mountain | 81 00 | 40 21 |
| Nolon | 30 00 | 40 22 |
| Nombre de Dios | 294 29 | 9 22 |
| Norumbega | 315 41 | 43 41 |
| Norweigh | 35 00 | 62 02 |
| Novograde | 57 11 | 53 02 |
| Nowgrod | 65 29 | 52 41 |
| Nowgorod | 62 51 | 60 29 |
| Nowgorod | 80 02 | 55 21 |
| Nubia Reg. | 57 02 | 13 00 |
| Nubia a River | 57 02 | 15 41 |
| Noremberg | 39 09 | 49 29 |
| Norwich | 27 15 | 52 45 |
| **O** | | |
| OBy a river | 107 01 | 55 00 |
| Occa a river | 77 29 | 55 41 |
| Olant | 43 29 | 57 00 |
| Oleron | 24 29 | 45 29 |
| Olone | 24 29 | 47 00 |
| Omagna Reg. | 310 00 | 9 00 |
| Omba | 54 11 | 66 51 S |
| Onega a river | 56 41 | 64 00 |
| Onegaburg | 59 29 | 62 29 |
| Opakow | 69 10 | 53 30 |
| Orcades Isles | 22 11 | 59 02 |
| Orellana | 310 00 | 5 00 |
| Orixa Reg. | 119 01 | 19 02 |
| Orleans | 28 29 | 48 02 |
| Ormus Isle | 91 20 | 28 40 |

| O P | Longit. | | Latitude | | |
|---|---|---|---|---|---|
| Orſa | 59 | 51 | 54 | 21 | |
| Orſa | 41 | 21 | 61 | 29 | |
| Ottona | 44 | 29 | 42 | 40 | |
| Ottonto | 49 | 24 | 40 | 21 | |
| Oxenford | 24 | 00 | 52 | 00 | |
| Oya Reg. | 75 | 00 | 13 | 00 | |
| Oſtend | 29 | 29 | 51 | 29 | |
| Orenge | 30 | 35 | 43 | 35 | |
| Orliance | 27 | 52 | 47 | 42 | |
| Oldſound | 31 | 36 | 51 | 35 | |
| Orfordnes | 28 | 00 | 52 | 15 | |
| **P** | | | | | |
| PAganſa | 99 | 51 | 45 | 00 | |
| Paito | 290 | 30 | 5 | 10 | S |
| Palagoſa | 47 | 29 | 43 | 00 | |
| Palandura Iſland | 108 | 00 | 11 | 00 | |
| Palacia | 60 | 51 | 39 | 21 | |
| Palma Iſland | 6 | 21 | 28 | 00 | |
| Palona | 105 | 10 | 2 | 00 | S |
| Palmer | 120 | 00 | 41 | 00 | |
| Pambolona | 24 | 29 | 42 | 41 | |
| Panama | 304 | 29 | 8 | 11 | |
| Pantanalia | 42 | 50 | 36 | 29 | |
| Panuco | 270 | 11 | 22 | 20 | |
| Pavia | 375 | 50 | 46 | 10 | |
| Patrick purgato | 15 | 55 | 54 | 32 | |
| Paris | 29 | 02 | 48 | 29 | |
| Parma | 39 | 20 | 45 | 11 | |
| Paſſan | 41 | 50 | 48 | 41 | |
| Paura | 37 | 51 | 46 | 11 | |
| Paznaſu | 155 | 29 | 45 | 51 | |
| Pechora | 65 | 51 | 67 | 00 | |
| Pechora Caſtle | 73 | 51 | 64 | 51 | |
| Pegu | 135 | 00 | 20 | 00 | |
| Peim Reg. | 132 | 00 | 51 | 29 | |
| Perigo | 323 | 11 | 43 | 21 | |
| Pernow | 53 | 29 | 58 | 41 | |
| Peru Reg. | 296 | 00 | 10 | 00 | S |

| P | Longit. | | Latitude | | |
|---|---|---|---|---|---|
| Peruſia | 42 | 20 | 43 | 11 | |
| Peſcara, | 34 | 29 | 30 | 11 | |
| Philippina Iſland. | 158 | 00 | 15 | 00 | |
| Palimbam | 142 | 40 | 7 | 30 | |
| Pico | 356 | 41 | 38 | 21 | |
| Piccora Reg. | 317 | 00 | 10 | 2 | S |
| Pigmea | 148 | 41 | 32 | 2 | |
| Pilimgu | 144 | 21 | 40 | 2 | |
| Pina | 296 | 21 | 3 | 1 | |
| Pinga | 101 | 40 | 14 | 20 | S |
| Port de los Leon. | 318 | 00 | 42 | 30 | |
| Piramides | 173 | 11 | 20 | 21 | |
| Piſa | 40 | 29 | 43 | 41 | |
| Pizan | 73 | 00 | 51 | 29 | |
| Plata | 315 | 00 | 19 | 51 | |
| Plimmouth | 21 | 11 | 50 | 51 | |
| Poosko | 48 | 11 | 52 | 41 | |
| Plotsko | 57 | 29 | 57 | 41 | |
| Podolia Reg. | 59 | 00 | 49 | 29 | |
| Poyctiers | 26 | 29 | 47 | 21 | |
| Poldavid | 20 | 5 | 47 | 55 | |
| Polonia reg. | 53 | 1 | 50 | 00 | |
| Buen Porta | 177 | 21 | 2 | 00 | S |
| Port de Canoas | 239 | 21 | 36 | 41 | |
| Port de Cavallos | 283 | 00 | 14 | 21 | |
| Port de la Concept. | 45 | 40 | 24 | 21 | S |
| Port Deſire | 313 | 00 | 47 | 41 | S |
| Port Famine | 302 | 51 | 53 | 11 | S |
| Port Fremo | 44 | 00 | 4 | 00 | S |
| Port Delgado | 42 | 11 | 3 | 51 | |
| Port de S. Miguell | 240 | 29 | 35 | 2 | |
| Port de Nigrillo | 296 | 51 | 17 | 11 | |
| Port a Port. | 17 | 30 | 41 | 15 | |
| Port Sallido | 186 | 41 | 3 | 00 | S |
| Port Santo | 10 | 00 | 32 | 29 | |
| Port S. Vincent | 337 | 21 | 23 | 51 | S |
| Prage | 42 | 29 | 50 | 00 | |
| Preſlaw | 49 | 40 | 51 | 11 | |

| P Q R | Longit. | Latitude |
|---|---|---|
| Preſlaw | 49 41 | 49 45 |
| Portland | 22 40 | 50 40 |
| Point Comfort | 309 10 | 37 12 |
| Primsberg | 43 30 | 55 11 |
| Pruſſia Reg. | 50 00 | 54 6 |
| Ptolomais | 66 41 | 29 40 |
| Punto de S. Hellen | 290 11 | 2 11 S |
| Punto de S. Hellen | 325 21 | 37 30 S |
| Punto de S. Lucas | 152 29 | 23 29 |
| Priaman | 118 00 | 00 20 |
| **Q** | | |
| Quanzu | 157 29 | 44 10 |
| Quelenſu | 158 29 | 36 1 |
| Quianſu | 144 41 | 42 20 |
| Quiloa Reg. | 69 51 | 8 51 S |
| Quinza | 153 00 | 40 1 |
| Quito | 293 11 | 00 11 |
| Quivira | 233 00 | 42 00 |
| **R** | | |
| Aguſy | 40 29 | 44 00 |
| Rameſes | 68 29 | 30 30 |
| Rane | 352 41 | 63 00 |
| Ravenna | 42 21 | 44 21 |
| Rhodes | 61 41 | 37 11 |
| Rianreech | 94 41 | 40 00 |
| Ribadeo | 20 21 | 43 21 |
| Richman Ile | 317 30 | 43 34 |
| Riga | 53 30 | 58 00 |
| Rems Rivers | 30 35 | 49 12 |
| Rio de Arboledas | 329 00 | 1 41 S |
| Rio de S. Auguſt | 350 00 | 15 3 S |
| Rio de S. Barbary | 326 41 | 34 1 S |
| Rio del Braſil | 348 21 | 17 11 S |
| Rio de los camerones | 42 00 | 5 25 |
| Rio de Camarones | 315 00 | 44 29 S |
| Rio del campo | 42 29 | 2 51 |
| Rio d'angla | 42 30 | 1 40 |
| Rio de Canno | 308 40 | 33 10 |

| R S | Longit. | Latitude |
|---|---|---|
| Rio dulce | 316 29 | 52 00 |
| Rio de S. Domingo | 353 00 | 7 51 S |
| Rio de baſtremo | 340 41 | 22 59 S |
| Rio de Flores | 287 19 | 29 00 S |
| Rio del gado | 34 21 | 6 21 |
| Rio de Gigantes | 278 29 | 29 00 |
| Rio grande | 301 11 | 11 00 |
| Rio grande | 314 29 | 44 00 |
| Rio del guato | 284 29 | 29 29 |
| Rio de la hecha | 304 15 | 10 41 |
| Rio de S. Helena | 348 41 | 10 29 S |
| S. Laurence River | 318 51 | 53 00 |
| Rio de Manicong | 48 21 | 10 00 S |
| Rio del Oro | 10 21 | 22 29 |
| Rio de palmas | 272 11 | 14 21 |
| Rio Panuco | 271 51 | 22 29 |
| Rio de perla | 292 29 | 29 00 |
| Rio de la plata | 326 29 | 36 00 S |
| Rio primero | 327 41 | 55 00 |
| Rio ſancto | 300 29 | 3 00 S |
| Rio de ſpirito ſan. | 281 29 | 31 00 |
| The white River | 308 11 | 51 21 S |
| Rypon | 35 29 | 55 21 |
| Roan | 27 41 | 48 51 |
| Rochell | 25 29 | 46 41 |
| Romey | 42 29 | 42 00 |
| Roſſewicke | 40 21 | 54 00 |
| Roſtowe | 72 11 | 57 00 |
| Ruſſia | 57 29 | 59 29 |
| Rye | 27 29 | 51 1 |
| Rio de ſenega | 14 25 | 15 6 |
| **S** | | |
| Abarſa | 154 51 | 45 00 |
| Sableſtan Reg. | 114 00 | 34 00 |
| Sabron | 84 51 | 45 11 |
| Saffee | 16 10 | 32 10 |
| Saendebar | 174 41 | 35 51 |

| S | Longit. | Latitude |
|---|---|---|
| Sagatin | 95 29 | 58 21 |
| Sala | 89 41 | 48 00 |
| Salamanca | 20 29 | 40 51 |
| Salasta | 72 41 | 41 51 |
| Salina | 45 00 | 38 29 |
| Salle | 20 10 | 33 30 |
| St. Sebastian | 24 25 | 43 15 |
| Salsburg | 42 00 | 48 21 |
| Salstem | 32 21 | 62 00 |
| Salvedo | 321 21 | 5 00 |
| Samaria | 72 21 | 33 40 |
| Sandersons Tower | 320 00 | 65 29 |
| Hope Sanderson | 326 21 | 72 41 |
| Sandry | 162 51 | 53 00 |
| Sanson | 20 41 | 43 21 |
| S. Crux | 334 21 | 43 29 |
| St. Christophers | 319 10 | 17 00 |
| St. Davids | 20 00 | 52 00 |
| S. Dominigo | 307 11 | 17 51 |
| S. George | 357 11 | 39 00 |
| S. Helena | 24 30 | 16 00 S |
| Santiago | 264 29 | 20 29 |
| Santiago | 298 11 | 32 11 |
| S. Jago | 175 29 | 2 00 S |
| S. John de luz. | 25 11 | 43 21 |
| S. Lazaro | 71 00 | 11 21 S |
| S. Lucar | 21 21 | 37 11 |
| S. Lucia | 1 1 | 17 00 |
| S. Malo | 24 21 | 48 50 |
| S. Maria | 82 29 | 17 00 S |
| S. Maria | 240 41 | 34 21 |
| S. Maria | 0 19 | 56 00 |
| S. Maries | 85 1 | 44 29 |
| S. Maries of Naza | 66 30 | 16 29 |
| S. Martha | 301 21 | 10 41 |
| S. Martin | 321 11 | 51 00 |
| S. Martins Ilands | 293 40 | 46 51 S |
| S. Mathewes | 21 11 | 1 51 S |

| S | Longi | Latitude |
|---|---|---|
| S. Michell | 60 50 | 65 29 |
| S. Michael | 0 50 | 38 5 |
| S. Miguell | 327 21 | 47 21 |
| S. Miguell | 291 41 | 9 11 S |
| S. Miguell | 268 00 | 24 00 |
| S. Miguell | 249 00 | 32 51 |
| S. Nicolas | 69 00 | 64 00 |
| S. Nicolas | 323 21 | 53 41 |
| S. Nicolas | 2 2 | 17 00 |
| S. Petro | 64 29 | 1 29 |
| S. Pol de Lyon | 20 41 | 48 48 |
| S. Samson | 306 29 | 40 29 |
| S. Vincent | 0 29 | 17 29 |
| S. Vincent | 318 41 | 11 51 |
| Sapora Iland | 107 11 | 00 29 |
| Sarachi | 84 29 | 44 11 |
| Saragosa | 26 11 | 41 51 |
| Sardinia | 39 00 | 40 00 |
| Satyrorum Iland | 174 11 | 46 30 |
| Satavapoly | 75 29 | 47 21 |
| Scarbrough | 24 51 | 54 51 |
| Shotland | 25 00 | 60 00 |
| Scotland Reg. | 20 00 | 57 00 |
| Segidin | 49 00 | 47 11 |
| Seames | 19 29 | 48 21 |
| Senega Reg. | 13 00 | 24 00 |
| Serneti Reg. | 106 29 | 33 29 |
| Saboliſher | 83 41 | 56 20 |
| Shahaskik | 91 29 | 53 9 |
| Shrewsbury | 22 35 | 52 55 |
| Sierraleona | 15 30 | 7 40 |
| Skalholt | 8 30 | 65 20 |
| Sibier Reg. | 99 20 | 59 30 |
| Sicilia | 45 00 | 37 30 |
| Sidon | 72 10 | 36 30 |
| Siam | 140 00 | 13 49 |
| Sinai Mountaine | 27 00 | 30 00 |
| Sinus Mexico | 280 00 | 26 00 |

| S T | Longit. | Latitude | |
|---|---|---|---|
| Sinus Perſia | 85 00 | 29 00 | |
| Sion | 59 10 | 12 40 | |
| Sipanto | 45 30 | 41 50 | |
| Sivill | 18 6 | 37 45 | |
| Slaba | 55 50 | 58 41 | |
| Slavonia | 47 00 | 45 00 | |
| Slego in Ireland | 15 35 | 54 15 | |
| Slowoda | 68 20 | 64 30 | |
| Slowoda | 86 30 | 58 51 | |
| Smyrna | 60 21 | 40 29 | |
| Snavell | 2 30 | 64 21 | |
| Sorlings | 18 00 | 50 00 | |
| Spacado | 46 50 | 45 21 | |
| Spier | 35 30 | 49 21 | |
| Spina | 60 50 | 43 29 | |
| Stad | 30 40 | 61 41 | |
| Stapholt | 2 20 | 65 41 | |
| Stetin | 42 10 | 53 51 | |
| Stoby | 52 30 | 44 00 | |
| Stockholm | 42 00 | 58 11 | |
| Streights of Maruchin | 74 30 | 73 11 | |
| Swedia Reg. | 40 00 | 60 00 | |
| Sumatra an Iſland | 134 00 | 00 00 | |
| Sohar | 92 23 | 23 5 | |
| Surrat | 109 50 | 20 7 | |
| Swally Road | 109 31 | 21 20 | |
| Saldania Bay | 49 40 | 33 40 | S |
| Silly | 18 00 | 50 2 | |
| Stert | 22 50 | 50 40 | |
| Sweinburn head | 25 00 | 59 51 | |
| Syria | 74 00 | 39 00 | |
| Syracuſæ | 45 41 | 37 00 | |
| Southampton | 24 5 | 51 11 | |

T

| T | | | |
|---|---|---|---|
| Taranto | 48 00 | 40 29 | |
| Taranaca | 306 21 | 30 41 | S |
| Trabacan | 109 29 | 34 51 | |
| Targa Reg. | 32 00 | 25 00 | |
| Taragona | 29 29 | 40 41 | |
| Tarſo | 71 21 | 40 00 | |
| Tartar | 152 00 | 63 21 | |
| Tartaria Reg. | 130 00 | 62 00 | |
| Tasken Reg. | 129 00 | 49 00 | |
| Tatracan | 55 00 | 44 51 | |
| Tecou | 116 29 | 00 41 | S |
| Tenariffe | 8 11 | 27 29 | |
| Tendua Reg. | 170 00 | 59 00 | |
| Teneſab | 46 41 | 61 11 | |
| Tarceta | 358 23 | 39 00 | |
| Terra alta | 160 29 | 6 51 | S |
| Terra alta | 45 21 | 15 21 | |
| Ter de los fumos | 322 29 | 40 21 | S |
| Tharſis | 115 29 | 49 00 | |
| Theſſalonia | 53 44 | 44 21 | |
| Texel in Hollaud | 31 00 | 53 15 | |
| Thoulouſe | 28 40 | 43 50 | |
| Thunnis | 67 40 | 32 00 | |
| Tygris a River | 84 00 | 34 30 | |
| Tocrors | 54 50 | 46 00 | |
| Togora | 146 00 | 49 50 | |
| Tolledo | 22 20 | 39 40 | |
| Tollon | 34 5 | 43 20 | |
| Toul | 33 10 | 40 10 | |
| Toures | 27 30 | 47 50 | |
| Trent | 40 10 | 46 10 | |
| Triago an Iſland | 278 40 | 21 00 | |
| Tribanta | 63 30 | 41 50 | |
| Trinidad | 355 20 | 19 10 | S |
| Trinidad | 295 50 | 21 20 | |
| Trinidad | 319 20 | 9 00 | |
| Trinity Harbour | 308 30 | 36 00 | |
| Tripolis antiqua | 44 21 | 30 20 | |
| Tripolis in Barba | 45 21 | 30 30 | |
| Tripolis ſoria | 72 21 | 37 00 | |

| T V W | Longit. | Latitude |
|---|---|---|
| Troyja | 59 00 | 42 30 |
| Troy | 31 00 | 48 10 |
| Tuna | 41 51 | 64 30 |
| Turſon | 131 30 | 56 30 |
| Tyrus | 71 35 | 55 30 |
| Tzercas | 79 50 | 49 20 |
| Tabo | 159 00 | 3 30 |
| Ternato | 160 50 | 00 55 |
| Tidore | 160 50 | 00 50 |
| Timor | 139 12 | 10 20 S |
| Tunis | 40 00 | 36 00 |
| **V** | | |
| VAlentia | 29 20 | 39 41 |
| Vareano | 107 50 | 39 00 |
| Varon | 83 30 | 70 30 |
| Vaygats an Iland | 81 30 | 69 21 |
| Venice | 41 40 | 45 51 |
| Verma Reg. | 133 00 | 21 30 |
| Varona | 40 40 | 45 50 |
| Viana | 17 30 | 42 00 |
| Viatea | 87 50 | 59 30 |
| Vienna | 45 30 | 48 30 |
| Villa longa | 28 20 | 7 40 |
| Ville conde | 17 30 | 41 30 |
| Virginia | 302 1 | 36 00 |
| Viſingrod | 61 30 | 51 30 |
| Bona Viſta | 4 30 | 15 30 |
| Buena Viſta | 308 4 | 40 11 |
| Buena Viſta | 177 30 | 13 30 |
| Ulm | 37 50 | 48 50 |
| Volga a River | 75 40 | 58 00 |
| Upſalia | 42 50 | 60 00 |
| Vigis a River | 85 50 | 53 20 |
| Viſting | 79 30 | 61 30 |
| **W** | | |
| WAersberghed | 39 1 | 57 20 |
| Wardhouſe | 50 30 | 70 26 |
| Earl of Warwicks foreland | 323 11 | 62 1 |
| Waterford | 17 15 | 52 16 |
| Count of Warwicks Sound | 330 41 | 64 41 |
| Wakefield | 23 48 | 53 45 |
| Waſſilgo Road | 81 50 | 56 41 |
| Waxon | 49 20 | 52 29 |
| Waymouth | 23 50 | 51 00 |
| Welichy | 96 30 | 56 00 |
| Wilikipoyaſſa | 101 20 | 63 29 |
| Wolifz | 63 40 | 56 51 |
| Weroy | 39 50 | 68 41 |
| Weſell | 31 29 | 51 29 |
| Weſterhold | 40 29 | 67 41 |
| Whitbay | 24 26 | 55 00 |
| Whitſon-head | 316 5 | 41 45 |
| Wiborough | 56 29 | 62 35 |
| White Iſle | 25 11 | 50 29 |
| Sir Hugh Willoughby's Iſland | 60 00 | 72 00 |
| Winterton | 27 20 | 53 29 |
| Wologda | 73 50 | 9 29 |
| Wologda | 74 30 | 60 10 |
| **X** | | |
| XAques | 282 20 | 20 29 |
| **Y** | | |
| YArmouth | 27 30 | 53 00 |
| Yorke | 23 30 | 54 29 |
| Yuagua | 303 30 | 21 00 |
| Yuch cope | 22 56 | 56 20 |
| **Z** | | |
| ZAcana a River | 6 40 | 13 00 S |
| Zacatula | 269 40 | 20 00 |
| Zacoton an Il. | 88 00 | 12 51 |

| | Longit. | | Latitude | | Z | Longit. | | Latitude | |
|---|---|---|---|---|---|---|---|---|---|
| Zama | 49 | 30 | 14 | 00 S | Zavan | 41 | 29 | 51 | 00 |
| Zama | 74 | 41 | 11 | 41 | Zedica | 48 | 00 | 29 | 29 |
| Zante | 52 | 00 | 38 | 00 | Zegzeg Reg. | 36 | 41 | 14 | 41 |
| Zeilam | 104 | 00 | 8 | 00 | Zovazembla | 83 | 29 | 74 | 00 |
| Zanhage Reg. | 20 | 00 | 24 | 00 | Zinguis | 76 | 11 | 49 | 29 |
| Zanziber | 73 | 52 | 5 | 29 S | Zoidalanell | 137 | 31 | 3 | 51 S |
| Zara | 46 | 25 | 45 | 41 | Zuenziga Reg. | 25 | 00 | 25 | 00 |
| Zaradrus a River | 126 | 00 | 64 | 00 | | | | | |

## The old Table of the *North-star*, newly Calculated by Mr. *Richard Norwood*.

| If the Chards be | Then the Load-star is | Degrees | Minu. | Of Declinatio | Under the Pole. | If the Chards be | Then the North-star is | Degrees | Minu. | Of Declinatio | Above the Pole. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| *N W by W.* | | 0 | 08 | | | *S E by E.* | | 0 | 08 | | |
| *Northwest.* | | 0 | 38 | | | *Southeast* | | 0 | 38 | | |
| *N W by N.* | | 1 | 07 | | | *S E by S* | | 1 | 07 | | |
| *N N W.* | | 1 | 33 | | | *S S E.* | | 1 | 33 | | |
| *N by W.* | | 1 | 55 | | | *S by E.* | | 1 | 55 | | |
| *North.* | | 2 | 13 | | | *South.* | | 2 | 13 | | |
| *N by E.* | | 2 | 26 | | | *S by W.* | | 2 | 26 | | |
| *N N E.* | | 2 | 33 | | | *S S W.* | | 2 | 33 | | |
| *N E by N.* | | 2 | 35 | | | *S W by S.* | | 2 | 35 | | |
| *Northeast* | | 2 | 30 | | | *Southwest.* | | 2 | 30 | | |
| *N E by E.* | | 2 | 20 | | | *S W by W* | | 2 | 20 | | |
| *E N E.* | | 2 | 04 | | | *W S W.* | | 2 | 04 | | |
| *E by N.* | | 1 | 44 | | | *W by S.* | | 1 | 44 | | |
| *East.* | | 1 | 20 | | | *West.* | | 1 | 20 | | |
| *E by S.* | | 0 | 52 | | | *W by N.* | | 0 | 52 | | |
| *E S E.* | | 0 | 22 | | | *W N W.* | | 0 | 22 | | |

FINIS.